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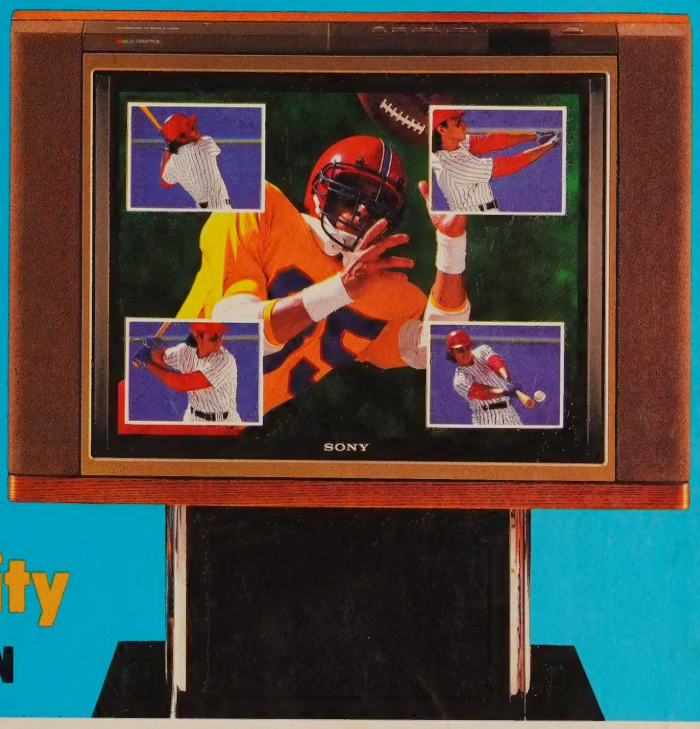

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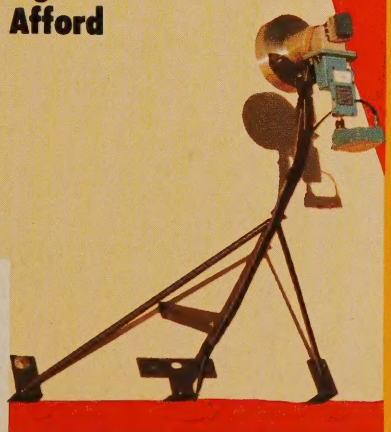

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SUMMER, 1987

Super Television

VOLUME 3, NUMBER 3

incorporating Home Satellite TV™

10 BOB WOLENIK
Satellite TV's New Boom
Breakthroughs in TVRO equipment.

18
The Amway System
A giant marketer goes satellite.

20 DAWN GORDON
Stereo TV You Can Afford
Easier steps to conversion.

26 JIM VINES
High Magnification Camcorder
Capturing faraway objects

28 CARL SANCHEZ
Tuning In Moscow
Making a North American connection

34
Wozniak's New Toy
The Apple man's programmable controller

36 MARC WIELAGE & ROD WOODCOCK
Did Your VCR Just Become Obsolete?
The dawn of Super VHS.

40 FRANK VIZZARD
Guide To Video and Audio Tape
For the confused consumer

44
High Definition TV
A new set that approaches the ultimate picture

48 ROBERT IRWIN
Breaking The Scrambling Barrier
Affordable program packages

56 MARC WIELAGE & ROD WOODCOCK
Guide To Monitors/Receivers
Buying your next TV.

64 BOB COOPER, JR.
Revolution In TV Picture Quality
Fascinating look to the future

68 DAN CHMIELEWSKI
Making Connections
Accessorizing your system

76 VIDEOFAX
The Ultimate Videophile
If you really want the best

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COVER - Some of the new products that make 1987 TV so exciting are the new SONY digitized monitor/receiver (page 56), the radical Planar flat "dish" (page 10) and the CL-9 programmable controller (page 34).

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Favorable Orbit For The Satellite Industry

As the satellite industry reaches mid-1987, the outlook for a return to significant consumer sales of home satellite systems looks good. Chief among the positive news is the various program packages coming on line which will offer consumers one-stop shopping for bundled services, with fierce competition between HBO and Showtime heating up the market for satellite services. In Washington, Senator Albert Gore (D-TN) and Rep. Billy Tauzin (D-LA) have reintroduced companion bills aimed at forcing most satellite programmers to deal with (non-cable) third-party packagers, and have the Federal Trade Commission conduct a study of consumer access to scrambled services.

Having completed a successful first trade show in Las Vegas (March 3-5), the Satellite Broadcasting and Communications Association (SBCA) has hired on new talent and greatly expanded membership categories beyond the old trade group, SPACE. Most of the major manufacturers are focusing their energies on bringing out a full line of IRD's (Integrated Receiver/Decoders) for mid-summer to fall introduction.

In fact, the price of a fully-functional satellite system including the IRD, dish, antenna, electronics and cabling could still retail at under $2,400, about the cost of a state-of-the-art system of a year ago. Those few new satellite customers wanting to buy a system without a descrambler may well be able to get rock bottom prices for complete systems.

New Bills, Old Issues

In Washington, the issue of satellite access at reasonable rates is still a priority for satellite industry members who are happy to see some program packages emerge, but would like to have other players besides cable operators or the programmers themselves who would also provide satellite program options for consumers. Senator Gore was joined by seven other Senators in introducing S. 889, "The Satellite Fair Market," which is patterned after last year's major satellite bill which was narrowly defeated last October, for consideration. Sponsors include Sen. Dale Bumpers (D-OK) and Sen. Wendell Ford (D-KY) who hope to hold hearings on the bill by mid-summer. In the House, Rep. Tauzin has found over 35 co-sponsors for the bill, numberd HR-1885, which is less likely to have hearings this year.

The bills would prohibit PBS (Public Broadcasting System) or the AFRTS (Armed Forces Radio and Television Service) from encrypting the portions of their signals intended for the general public. The bills would direct the FCC (Federal Communications Commission) to ensure all rural Americans have access to signals of the Big Three networks, as well as having the FCC establish a uniform scrambling system for decoders. "Satellite dish owners are willing to pay a reasonable price for programming," said Gore, "but the price being charged today is not being set by the marketplace, because the supply of programming is controlled by a technological competitor" (cable TV).

To Buy Now, Or Wait?

If you've been toying with the idea of buying a home satellite system, you have undoubtedly been through a myriad of questions which have delayed, or totally shelved your plans to buy today.

Looking back, it was a scant five years ago that the average satellite dish cost the consumer over $8,000—and this was a barebones system at that. To

Continued on page 8

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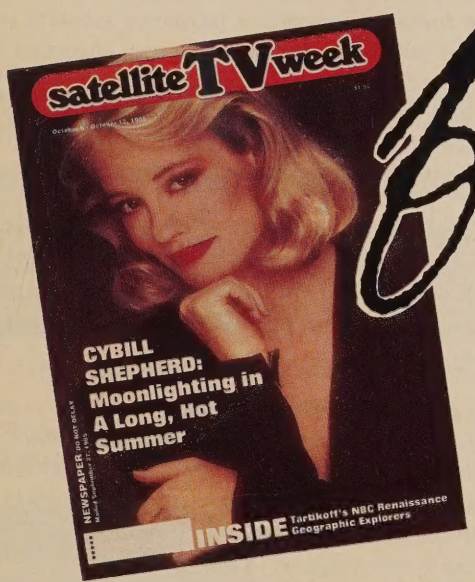
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Favorable Orbit *from page 6*

move from satellite to satellite you had to go outside and crank your dish, hoping to hit the right bird by having some elementary marks ground into the bar on which the cranking device mounted onto the dish. To get from horizontal to vertical polarity (these are the two "sides" of the single channel which allow satellites to have 24 channels rather than 12) you might have employed a "rotor" similar to the outside TV antenna rotors used to get VHF and UHF reception. Of course, in 1981-82, things like stereo audio, digital audio or even remote control were just getting to the drawing boards, and nowhere to be found for the consumer. And remember, your $8,000 investment back then would still not guarantee that your various system components would always work.

Of course, five years ago there was no scrambling, and one might argue that the fact that programming was "free" then, the higher cost of the system was "a deal." As more companies got into satellite manufacturing, the systems became more reliable, more sophisticated and even as more features were added, the price came down.

SBCA Forges Ahead

With SBCA president Chuck Hewitt and vice president of operations continuing on with the group, the newly formed board of directors has committed to fund the trade group so it may focus on consumer education and promotion of satellite technology.

Joining SBCA as manager of public affairs, Christine Gliozzo will be responsible for promoting public and media understanding of the home satellite industry. Gliozzo formerly served as a legislative assistant to the House Telecommunications subcommittee under former chairman Rep. Tim Wirth, who is now in the Senate.

Fischette wants to rebuild confidence in the dealer/retailer group, and show them that a viable trade group can benefit all segments of the industry by bringing new customers into the door to re-analyze their opinion of satellite TV.

The SBCA has a divergent membership, with space segment firms (like COMSAT and RCA Americom), programmers (HBO/Showtime/ Turner Broadcasting and others) joining the more traditional manufacturers and dealers of TVRO to forge a new trade association representing the broad spectrum of satellite communications for the future.

Will Proposed Tariffs Increase TVRO Costs?

With virtually all of the satellite receivers and other electronics made overseas, we asked key industry manufacturers what they planned to do if in fact home satellite equipment joins other products like stereos, computers, TVs and other Japanese produced consumer products in possibly doubling in price.

With the upswing in demand in the 1982-83 period, most U.S. manufacturers began to explore ways of having equipment produced in mass quantities at lower prices and initially went to Japan. One of the first companies to provide off-shore production was KLM, with the introduction of the Sky Eye 10, which was built for a time by Pioneer. Soon after, a massive introduction of home satellite gear came from Uniden, followed by other Japanese firms like DX Communications (division of C. Itoh), Panasonic, Kenwood, Fujitsu, Hitachi, Sony and NEC.

Now most satellite electronics manufacturing has moved to Taiwan, Korea, Hong Kong and mainland China. And whether the proposed Japanese tariffs will impact these other Far East points for manufacturing remains unclear. "Any company in the market could swing anywhere" says Dick Gonzales, national marketing manager for DX, a major player in the satellite business that still originates manufacturing in Japan. Gonzales refused to release figures, but did say a significant number of DX inventory "has been landed," and therefore wouldn't be subject to new tariffs anyway.

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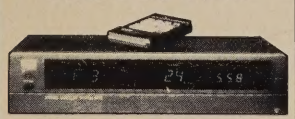

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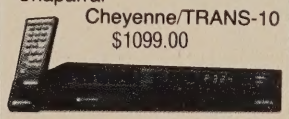

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SATELLITE TV's NEW BOOM

Dish Innovations And Descrambling Receivers Lead the Way To An Awakened Market

by BOB WOLENIK

Mark Twain was fond of saying, "Rumors of my demise have been greatly exaggerated!" The same can be said for the home satellite TV field.

Last year with the advent of the scrambling of several premium channels, enthusiasm for home satellite receivers virtually came to a halt. By last summer sales of new equipment were reported down by as much as 85 percent! Many manufacturers went out of business. More than half of all retailers of home satellite equipment disappeared. To those observing the field from the outside, it might have indeed looked as though it had died.

That was not the case, however. The "Great Washout" as last year has been called did remove the weakest players. And interest in the field certainly bottomed. But the game itself did not die.

Quite the contrary, enthusiasm for home satellite reception has rebounded and has been steadily increasing since the first of this year. Remaining retailers are all smiles and many are reporting their best 6 months *ever* since January.

Why the turn around? What's happened to make this once moribund field suddenly blossom back to life?

Actually, there have been two developments. The first is a practical way of getting descrambled signals at a reasonable price. (See the article in this issue on "Packages.") The second is the development of new and improved equipment to handle descrambling and bring in better reception. We'll focus on the latter in this article.

A New Life - *If you thought that home satellite TV was down and out for the count, it's time to reconsider. Last year's bleak picture has given way to booming sales as videophiles snatch up the new gear in order to get the very best quality in sound and sight. New program packages have made worry over scrambling a thing of the past and IRDs (Integrated Receiver/Descramblers) have become the most sought after item in the marketplace. Efficient dishes are also radically changing how we think of a home system.*

IRDs

The code name for the new wave of equipment is IRD (Integrated Receiver/Decoder). It simply means that a VideoCipher descrambler is incorporated right in the receiver. Several companies are now offering this product. They include:

Chaparral Communications
Houston Tracker
Ecosphere
Channel Master
Drake
General Instruments
M/A-COM

Continued on page 12

New Boom *from page 11*

When you have an IRD, you no longer have to worry about scrambling as a real issue. Rather, your receiver has the capability of unscrambling virtually any scrambled signal now being broadcast . . . for a price.

To address (turn on) a channel simply means that you call the "800" number for that programmer, become a subscriber and pay your monthly fee. (The monthly fees have become quite reasonable - around $20 for as many as a dozen premium channels.) You don't need to have additional equipment or connections.

Quite possibly by the end of this year virtually all manufacturers will be making an IRD unit.

What IRDs have done is to make it easy to once again get all sorts of signals from satellites direct to your home. Of course, the days of free TV are gone. But the high quality reception, both sight and sound, and the diversity of programming (more than twice what you'd find on a typical cable system) are strong drawing cards and viewers are responding in ever greater numbers.

In addition, there are also a number of other technical developments which make home satellite viewing more promising. Included are improved dishes, new streamlined receivers and an apparent settlement of the "black box" issue.

NEW FLAT PLATE DISH

One of the problems (some say the BIGGEST problem) with having a home satellite receiver is the size and shape of the dish. A typical dish requires a substantial amount of room in the yard (or on the roof) and is visable for some distance. While many believe it is aesthetically pleasing (in a high tech sense) many others feel that the typical dish is simply an eyesore. What to do for those in the latter category?

Solutions to dish appearance problems have appeared on the scene from time to time. One manufacturer was so bold as to put an umbrella over his dish and a picnic table under it. Thus disguised (with perhaps a barbecue roasting ribs nearby), who would suspect that a high tech antenna was around?

Another enterprising manufacturer built dishes into the base of concrete patios. These "below ground" antennas worked fine . . . until the first rain storm when they tended to turn into bird baths.

The real answer, however, according to many users and manufacturers, is to produce a *flat* dish. A flat antenna offers many advantages.

Instead of requiring a mount and a large plot of land, it can simply be hung on the side of a house. Or placed inconspicuously on a roof. The very flatness of the antenna would tend to give it a more acceptable appearance to a host of people.

A number of issues past (when this magazine was called "Home Satellite TV") we did a story on a flat plate antenna. Although we simply mentioned it in passing, we received hundreds of calls and many more letters of inquiry. Where was this antenna to be found? How could the caller purchase one?

Deciding that this had the makings of a big story, we called the manufacturer (Phase-Com) back again . . . and again. For some reason, they never returned our calls.

Then we began receiving worried calls from individuals who were considering investing money with the company in order to become dealers. When was this antenna going to be produced? When would it be on the market? Did it really work.

To date, we have yet to see one in operation.

The basic idea behind this Phase-Com dish was a high-tech concept called "phased array." Instead of a dish gathering the signal from a satellite thousands in miles of space and then focusing it on a central amplifier (LNA/LNB), the phased array antenna relied on pure electronics. "Arrayed" on a flat surface were electronic sensors which could pick up the signal. Then, using a sophisticated tuner, they were all "focused" on a particular satellite's signal and, in a breath, you had your signal. The flat plate didn't have to be aimed in the direction of the satellite. It didn't even have to face it head one. It was all done with circuitry.

Can such a dish really work? Indeed it can. Hughes Communications has been making phased array antennas for the military for years. (They are used on submarines and ships where constant movement makes a standard dish impractical) Hughs even has plans to put one on car tops to receive two way communications in any part of the country.

But there is a problem. Phase array is expensive. The best estimate we've heard from Hughs is that a phased array dish capable of tuning in today's satellites would cost upwards of $10,000. Yes it works. But, the price is prohibitive.

Enter a new company, Tsiger Planar, Inc. (2300 Powers Plaza, 2446 Waynoka Rd., Colorado Springs, CO 80915). Tsiger has developed a new flat plate dish that is both cheap and it does work. (We have seen this one in operation.)

It doesn't use the advanced phased array technology. It does require a feedhorn. It doesn't really compare with a 9 foot dish. But it does work and it does outperform some of the smaller dishes on the market today.

Called the Planar C-100, the dish is made of a foam core inside of a thin shell. In many ways it resembles a large book. When you want to use it, you simply unfold it, lay it flat, set up the LNA, focus on a satellite and off you go.

The dish measures 65 inches by 65 inches (roughly half that size for carrying). It's focal point is 27 inches away from the surface and it is made of ABS Rovel Enhanced Plastic. The manufacturer claims that it out performs some 6 foot dishes.

This dish is ideal for temporary installations. You can use it on a recreational vehicle or take it with you when you go camping.

Additionally, it can be used as a permanent dish in those tricky kinds of installations where, for one reason or another, a traditional curved dish simply won't work.

Continued on page 14

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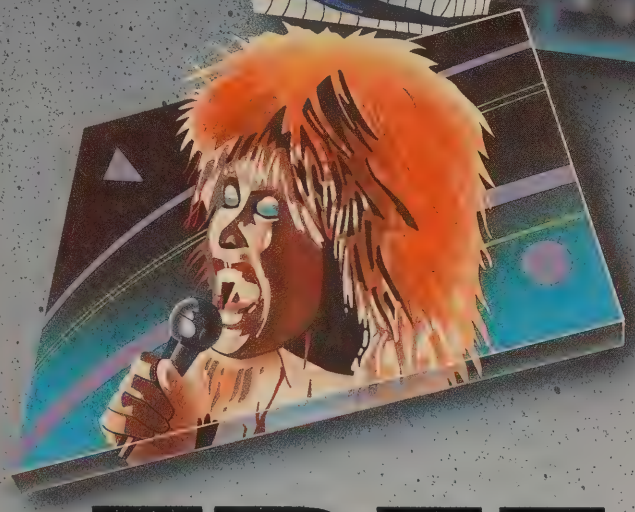

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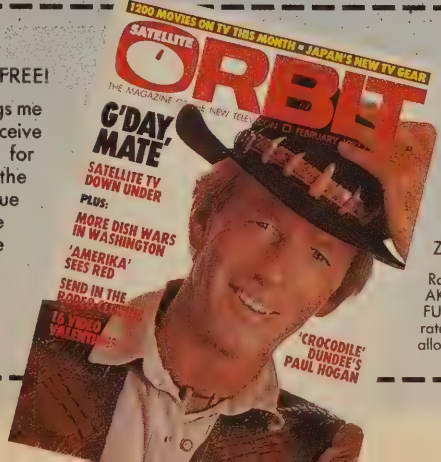

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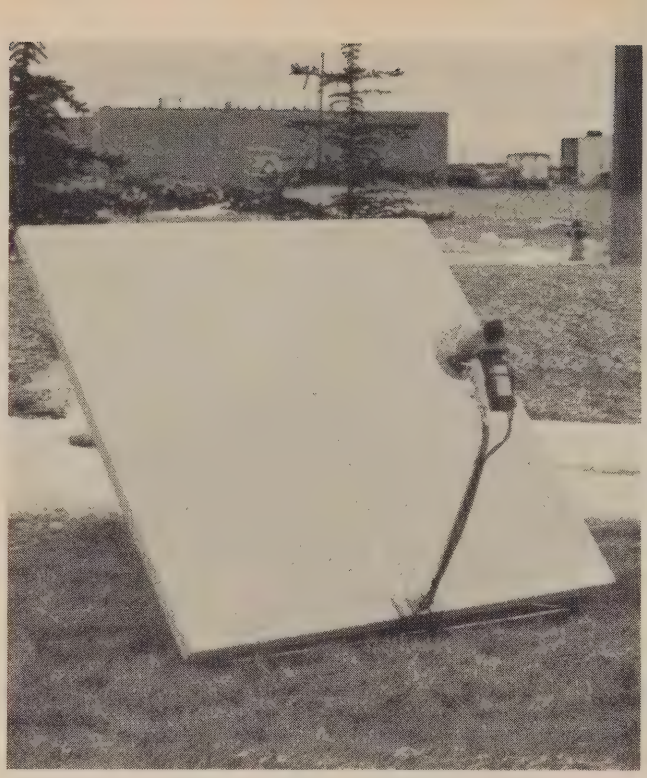


It Works - *Light weight flat dish is suitable for both mobile as well as permanent installations.*

New Boom *from page 12*

The Planar is really a dish of convenience. It uses the old technology in a new way to solve problem. Until the new technology becomes cheaper, it may indeed be a better mousetrap.

UFO DISH

While on the subject of dishes, another new dish has just been introduced that bears careful consideration. The manufacturer, Schudel Associates (199 N. Camino Real, Suite 303, Encinitas, CA 92024) calls it the U.F.O. No, that's not Unidentified Flying Object - it stand for "Ultimate Final Objective in dish design", which admittedly is stretching a bit.

We prefer to dub it the "egg" because of its unusual configuration.

The UFO (or egg) looks a great deal like two dishes butted together. Indeed, that is what it is, in a sense. The back or reflective half of the dish is made of solid aluminum foil bonded to an impact resisting plastic housing. The top or cover of the dish (ra-dome) is made of electrically transparent material that allows the signals from the satellites to pass through without being impeded. It is made of non-hydroscopic resilient impact resisting plastic.

The way it works is that the signal passes through the electrically transparent top and hits the reflective inner surface of the bottom. The signal is then focused by the parabolic shape of the dish onto the feedhorn.

Sound like a traditional dish?

In many ways it is. However, the manufacturer, Conrad Schudel, points out that there are some significant differences. In a traditional dish, wind, heat from the sun, aging and other factors tend to distort the surface of the dish. Thus much of the signal is lost due to an inability of a standard dish to maintain a strict parabolic shape.

Conrad notes that traditional dish manufacturers frequently attempt to overcome this problem by placing a steel band around the perimeter of the dish. This, he says, only tends to make matters worse as the steel expands or contracts in the weather thus contributing to the bad focus of the dish.

The reason that traditional dishes work is that they are so large that even after they lose some of the signal through sloppiness, enough remains to produce a picture.

It's quite different with the UFO, claims Schudel. This new dish maintains its shape *perfectly*. The reasons is its egg-like design.

Consider a common egg. Have you ever seen one that could have its shaped altered? Broken, yes . . . but altered?

The reason an egg is so tough is that its roundness gives it a structurally near perfect design. Like a dome house or any other similar shape, all the parts contribute to the rigidity of the structure. Similarly, once put together the UFO, like the egg, with both a top and bottom becomes similarly rigid. It is forced to maintain the shape with which it was designed.

Thus the UFO, according to its manufacturer, is the ideal dish for precise focusing. Of course, its design also offers other advantages.

The streamlined shape provides lower windloads and it is thus less likely to get toppled or broken in a storm. Also, because it is completely covered, it is less subject to moisture damage. It sheds water, snow, ice and leaves.

Schudel also notes that the dish has a perimeter shield which prevents over-illumination (inability to focus cleanly

Carry It Along - *The Tsiger Planar folds in half and is easily carried in the back of a car or truck.*

on a single satellite). The result is that the dish reduces side lobes or interference from other satellites and permits higher signal to noise ratios.

A NEW "HIDDEN" SYSTEM

One of the newest entrants into the home satellite field is Amway Corporation with their home satellite system. Amway is one of the world's largest network marketing companies with sales of over $1.3 billion. Amway products and salespeople are very well known. But, this is their first concerted effort to sell satellite equipment direct to consumers.

It may seem unusual for a company like Amway to be selling satellite equipment . . . until you realize that satellite sales are growing steadily and with Amway's inplace distribution network, it can tap millions of potential users. In addition, Amway is selling a *total* system. That means that you get everything including installation!

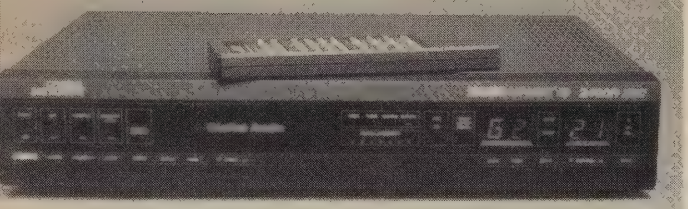
Of course, the system is only as good as the electronics. Called the ARS2000 satellite system, the unit features a high performance receiver, remote control, linear actuator arm and Winegard 10 foot dish.

Amways boasts that theirs is one of the most user

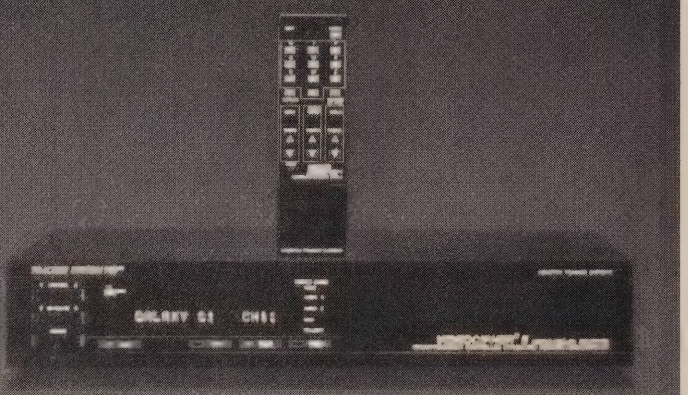
Continued on page 16

Complete Integration - *Channel Master receiver features c/Ku bands, dish positioner and descrambler in a single unit.*

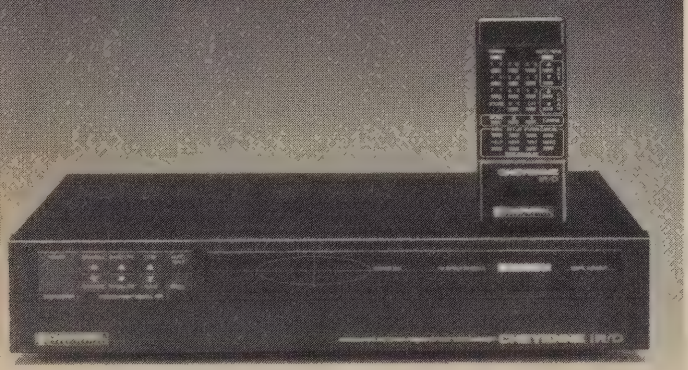
General Instrument's VideoCipher II 2400R Satellite Receiver.



Houston Tracker's microprocessor controlled receiver/descrambler.



Chaparrel's high performance Chevenne IR/D (Integrated Receiver/Descrambler).



New Boom *from page 15*

friendly systems on the market. The funny thing is that they could be right.

The receiver is based on the old Intersat receivers. (Intersat went out of business a few years ago). The old Intersats had some of the best on-screen graphics ever produced. When you wanted to switch to a satellite, you would see a ring of satellites on the screen and you would see (with animation) each broadcasting a signal in turn to your receiver until you arrived at the desired bird. For knowing where your dish was aiming, there never has been nor probably ever will be anything clearer.

The problem with the old Intersat sets were that while the on-screen graphics were very user friendly, the controls were not. I can remember a representative of Intersat offering to send each buyer a set of glass tumblers if they could complete the user's manual. Now that's tough marketing!

What Amway has done is to have its (and probably Intersat's original) engineers rework the equipment to make the controls understandable. They have succeeded.

Like the Arunta (another high end brand receiver), the "set" itself is not kept anywhere in sight. Rather the receiver and peripheral equipment can be stored behind the TV or in a cabinet or even in another room.

The only thing that shows is an infrared eye. This is placed conveniently near the TV. After that, all the controls of the set are handled by means of the remote.

In addition, the system comes pre-programmed to all the current satellites and channels from the factory! That means that there's no big effort needed (and hours spent) trying to call up different satellites and then different transponders on them. Once the system is installed, you simply turn it on and you're off and running.

The evaluation model we received even came programmed with the name of our magazine, on-screen, when the set was turned on. (The only drawback was that the programmers misspelled the word "magazine," but then, you can't have everything!)

The current receiver is strictly a C-band unit. But Amway has just introduced software to make it Ku Band compatible.

The ASR2000 is truly a "system." It comes with a special linear Acme Screw Actuator that utilizes a visual sensor. It is intended for use with a Winegard Model CK-1088 dish which is also included with the system.

The drawback here is that you can't use the system with all brands of dishes. For example, we have a paraclipse CD 12 foot antenna - usually considered a top-of-the-line item. However, because it has a horizon-to-horizon cog driven mount, the ASR2000 couldn't be hooked up to it.

Which is to say, that the ASR2000 is intended to be sold as a system. When you buy it you get everything you should need including receiver, actuator, controls and dish. The only thing left is installation - and Amway has taken care of that as well!

Amway advises its purchasers not to install the system themselves. (This is probably a good piece of advice since the linear arm and the dish require a precise hookup.) To

provide installation, Amway uses the Digitron installation system.

Digitron Communications, Inc. contracts with installers around the country. When you buy an Amway dish and want it installed, you call a special toll free number and that puts you in touch with Digitron. It then contacts a qualified installer in your area and very soon your dish is put up.

The price for a standard installation is listed at around $600 which may be a little bit on the high side.

Amway also gives one of the longest limited warranties in the industry - two years. (It will not accept refunds unless the product has not been taken out of its packaging and unless the customer provides evidence that the site was unsuitable.)

Advantages: To summarize the advantages of the system - it has the best on-screen graphics that we have seen. The reception, as far as we could tell, is equal to some of the better sets on the market; the unit is as inconspicuous as you could ever want (only the electric eye sensor shows); there is a strong warranty and an in-place program for installation and repair.

Disadvantages: Quite frankly, the unit is a bit expensive. The suggested retail price is $2995 which places it as a high end systems. When you add installation, taxes and incidental costs, we're talking about a $4,000 system.

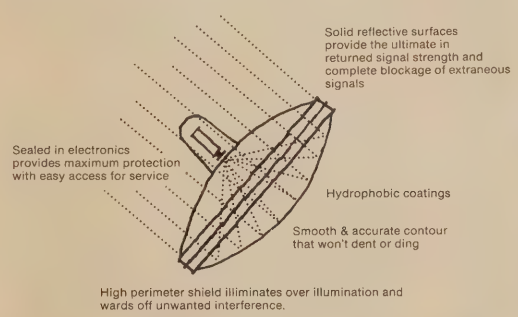
Overall, if I had a choice of buying this ASR2000 unit, I would probably get it. I really liked the on-screen graphics and I figure they are worth the price.

Of course, there is a great deal more in the way of new equipment coming just over the horizon. The truth of the matter is that today, the individual who gets a home satellite receiver is usually interested in more than just diverse programming.

Today the home viewer is interested in the best picture and the best sound and the home satellite receiver is only one aspect of the overall home entertainment scene. Typically such a person will also own a big screen TV, a VCR, a stereo/surround sound system and much more.

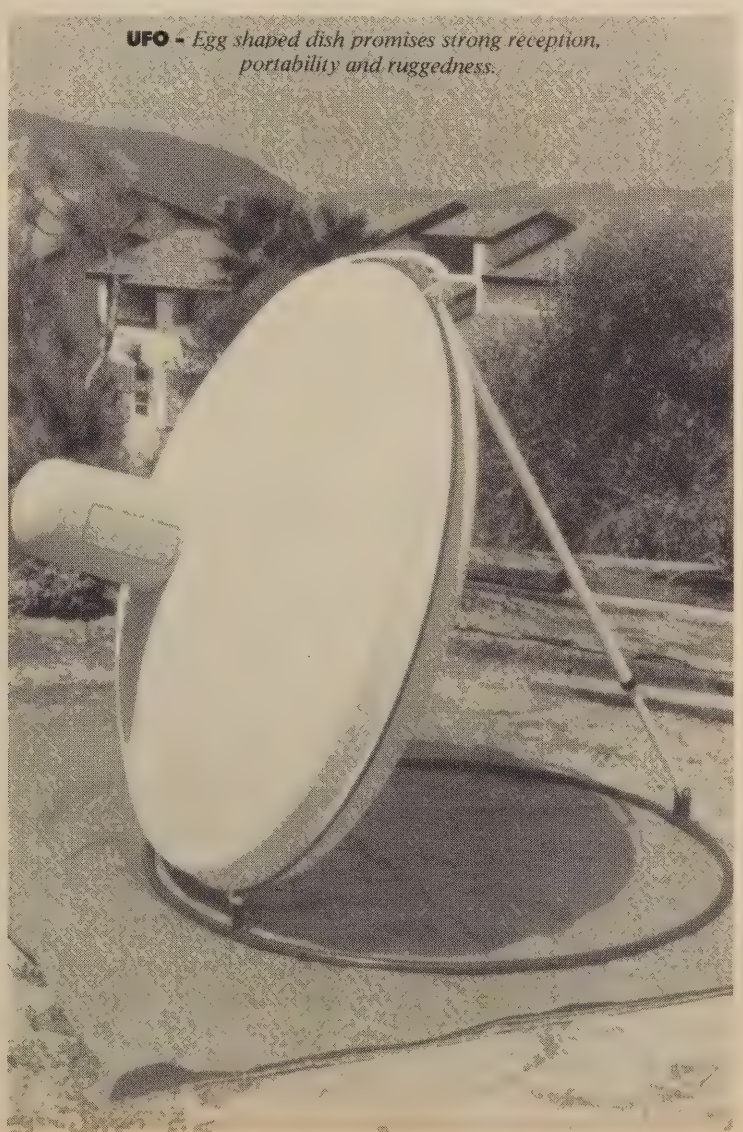
Of course it all starts with the home satellite system, at least for live TV viewing (as opposed to tapes). If you've considered getting in on the new high-tech revolution, but have been putting it off because of fears of scrambling, it's time to change your position. If sales are any guide, the new era of home satellite viewing is just beginning.

Electronically Transparent - *Cover dome allows signal to penetrate while shedding snow, hail and leaves.*


Solid reflective surfaces provide the ultimate in returned signal strength and complete blockage of extraneous signals
Sealed in electronics provides maximum protection with easy access for service
Hydrophobic coatings
Smooth & accurate contour that won't dent or ding
High perimeter shield illiminates over illumination and wards off unwanted interference.

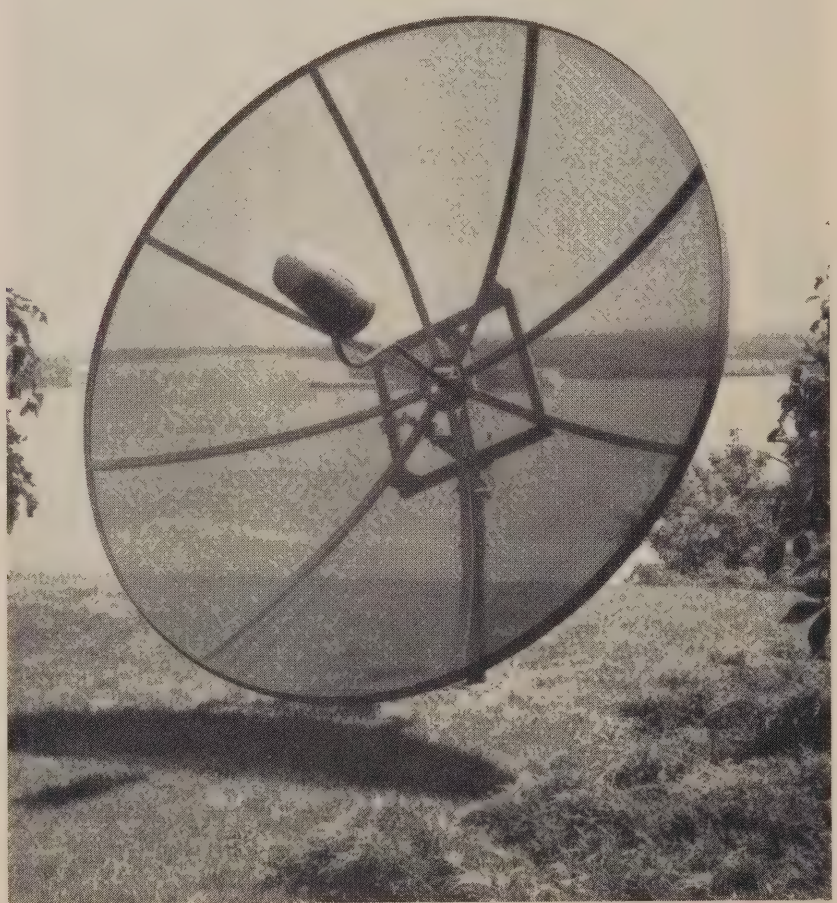
Fixed Feed - *Radical design prevents warping that could affect dish's focus.*

UFO - *Egg shaped dish promises strong reception, portability and ruggedness.*



The AMWAY System

The Giant Marketer Steps In With A Complete (And Visually Radical) System—And Installation



The ASR2000 by Amway is one of the better receivers we've seen. It has many features which a consumer will find desirable.

Onscreen graphics: As the positioner moves the dish from satellite to satellite, a visual image of each satellite is projected on the screen. The visual image corresponds quite closely to what's actually happening outside.

Receiver: The picture quality is average to better than average. The receiver unit itself, however, is boxlike and quite unattractive. Of course, it is not designed to be kept out in the open, but instead hidden somewhere such as in a piece of furniture or perhaps in a closet. The problem here is that the cord leading from the hidden receiver to the infrared eye, which remains out front on the TV is quite short. A longer cord is going to be a necessity for clean installations.

Remote: The remote works *all* the functions of the receiver. In general it is easy to use and quick to learn. One problem is that it is difficult to switch directly from one function to another. For example, an on-screen menu must first be turned off before the remote can move to a different on-screen display.

Installation: The installation must be careful and accurate for the on-screen displays to work properly. This is not a unit for a home installer—professional help is a must.

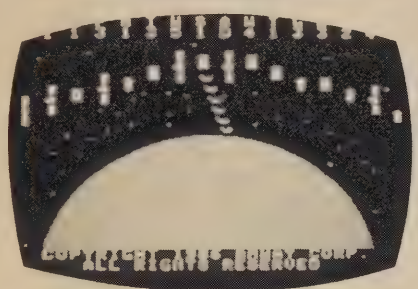
Dish: The Winegard 10 foot mesh dish is one of the better available on the market today.

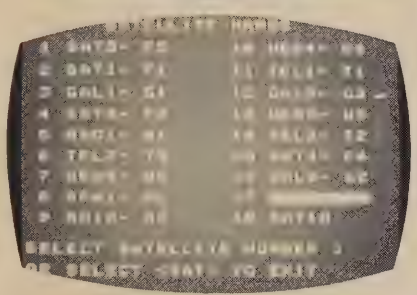
Price: The price tag of $2,995 includes all equipment including dish. It does not include installation.

Warranty: The two year limited warranty is one of the longest on the market today and is backed by one of the biggest companies offering home satellite receivers.

Installers Vance Hallman (left) and Gary Carlson check out the on-screen graphics.

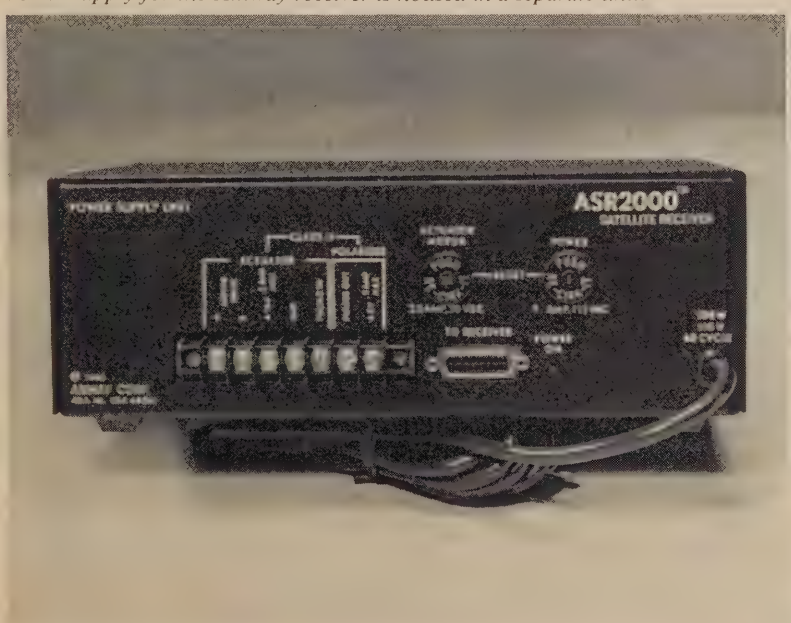
Satellites on the Horizon - *Depicting signals from space, the receiver indicates which satellite transmissions are being received. Below is a menu indicating current birds in space.*





All functions of the receiver are handled from the relatively easy-to-use remote.

Power supply for the Amway receiver is housed in a separate unit.



The working end of the ASR2000 receiver.

STEREO TV You Can Afford

Late Breakthroughs In Low Cost Sound Processors

by DAWN GORDON

In 1984 stereo television broadcasting was an occasional event for the privileged few. Only one major network had regular programming, only a handful of stations had the proper transmitting equipment, cable system stereo was simply a dream, and there were very few sets available with built-in stereo decoders.

Today things are quite different. All three major networks and many independents are broadcasting in stereo with over 400 stations equipped to transmit it. NBC has more than 100 affiliates with stereo capability, CBS has 47 and ABC has 41. By year end it is expected that over 1000 cable stations will have stereo gear, and all major TV manufacturers have a wide range of stereo sets in their lines. As far as programming goes NBC takes the lead with all but a few of its prime-time shows in stereo, as well as the upcoming addition of daytime stereo fare; CBS Sports and a few prime-time shows have begun to appear on the number two network, and ABC is adding a number of programs as well.

Fortunately, all this "stereo awareness" has had a positive effect on the availability and pricing of stereo-ready and stereo add-on equipment for the home. Multichannel TV Sound (or MTS for short) is changing the way we watch and listen to TV. Finally, we can achieve what has been missing from the start: TV sound that rivals the latest in television picture technology—and it doesn't have to cost you an arm and a leg.

STEREO-READY TV

Obviously the most expensive way to receive MTS is to purchase a new TV set or VCR that is designed to receive it. Just like cable-ready televisions that receive mid and superband cable channels, stereo ready televisions and VCRs contain the circuitry necessary for decoding the stereo and Second Audio Program (SAP) signals. Brands such as RCA, Mitsubishi, Philco, Quasar, Radio Shack, and Samsung have MTS TVs that list at $550 or less, and Sanyo even has a unit that lists for $450. However, most stereo TVs are mid to high-end 1987 models that contain not only the decoding circuitry but also higher quality speaker systems as well. In addition, many of these sets also contain audio outputs for connection to a stereo system, so that TV sound can be played through higher quality speakers. In some cases, stereo TV's also incorporate built-in amplifiers (5-25 Watts Per Channel) so that you may connect external speakers to them.

STEREO-CAPABLE SETS

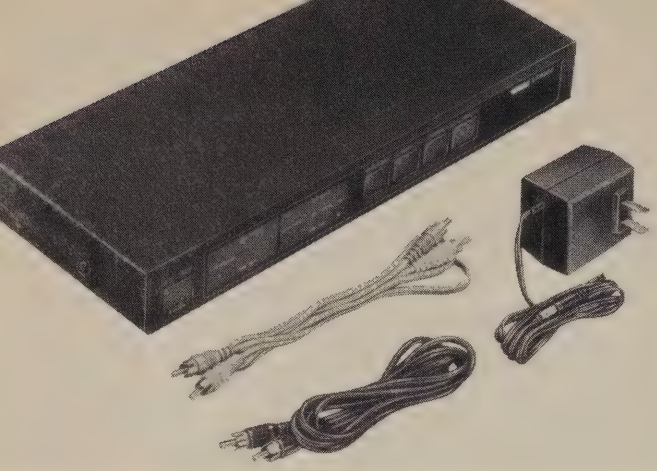
If you purchased a top of the line 1984-1985 set, or a mid to low-end 1986-1987 model TV from manufacturers such as Pioneer, Sony, Proton, RCA, Zenith, NEC and others, there is a very good chance that it is stereo capable. What this means is that the set has a special MPX (Multiplex) output designed to accept a MTS stereo decoder.

MTS decoders are available from many different manufacturers, and like anything else, it's best to purchase the decoder from the manufacturer that produced your TV. This is because some manufacturers use different MPX outputs than others, and compatibility may be a problem if you decide to mix and match. Because these decoders lack their own built-in tuners and rely on the TV's own tuner, they are relatively inexpensive, and easy to use. Just plug it

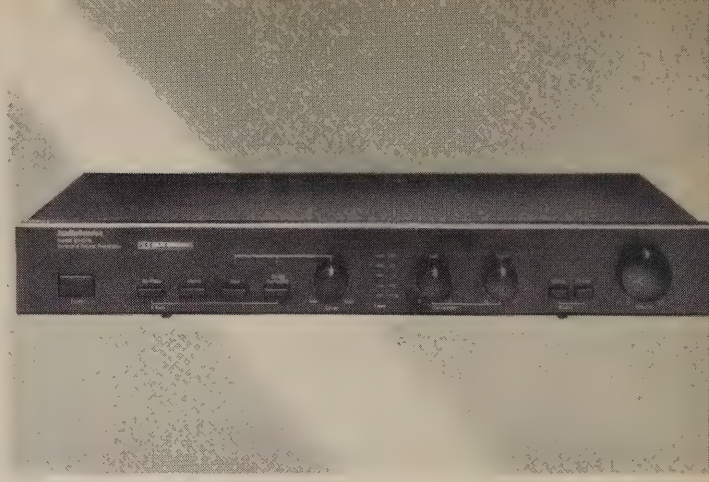
Continued on page 22

The Ultimate In Theatre Sound - *Kenwood's SC-75 (bottom) offers Dolby Surround Sound for under $235 - just hook up an extra pair of speakers (and amplifier) and you're ready to roll. A different approach is taken by Sansui with its Cinema-Surround remote audio/video control center. It has two stereo amplifiers (for front and rear channels) and includes a built-in Super Bass Synthesizer. Filled with bells and whistles, it is a top-of-the-line professional style piece of equipment for under $700.*

S-XV1000
KENWOOD AV SURROUND PROCESSOR SC-75
SURROUND SELECTOR
DELAY
CALIBRATION LEVEL



Missing Link - *Combines non-MTS TVs with home stereo system to provide stereo TV playback - Gemini, Clifton, NJ.*



Surround Sound - *Model SS - One offers Dolby, from AudioSource, $1200.*

Stereo TV *from page 20*

in, and forget about it. Manufacturers such as Pioneer, Proton, Sony, Sansui and others sell MTS decoders priced anywhere from $150 to $200. The more expensive models offer built-in stereo amplifiers, and audio output jacks for direct connection to an existing audio system.

Stereo VCRs, whether they use HiFi or linear stereo circuitry, will also need an external MTS decoder if they do not have one built-in. Without a decoder you will be recording in mono. Although almost all top-of-the line VCRs contain built-in MTS decoders, mid-priced stereo models may not include it. However, most of these units incorporate a MPX terminal for connection of an outboard decoder.

THE MONO APPROACH

If you are part of the majority in this country, you do not have a stereo-ready TV set, and therefore cannot receive MTS encoded broadcasts. The same holds true for those with stereo sets connected to mono cable systems—you have the right equipment but the cable company doesn't.

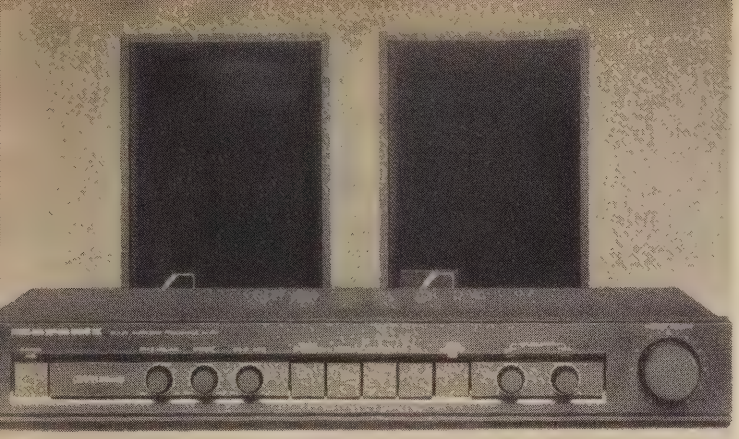
Because cable operators chose to fit so many channels in such a tight space many cable affiliates will have great difficulty sending MTS through their systems without modification to their head-end equipment, and the use of stereo capable converter boxes. Because cable channels are so tightly packed together a steep slope filter is used in the converter box to prevent adjacent channel information from leaking through. Unfortunately, the frequencies that are cut out are those that are used for MTS signals. In some cases cable companies have provided a pseudo-solution to the problem by feeding the stereo audio portions of their broadcasts to the FM band. Subscribers receive the audio by connecting a cable to their FM tuners for simulcast stereo. This approach is not only inconvenient, but completely unnecessary.

Cable companies that are willing to spend the money to modify their head-end equipment can pass the signal through. The subscriber will then use his stereo-ready TV to decode the MTS signals and use the converter box for decoding premium channels. For those systems using baseband converter boxes to decode premium channels, new stereo converter boxes will be needed.

Fortunately, manufacturers have solved the problem of mono cable systems and mono TV sets, as there are numerous external MTS decoders available to you. Basically, all you have to do is attach the decoder to your home audio system, and stereo broadcasts are yours.

This type of MTS decoder is a little different from the kind that connects to an existing MPX jack. Because the

Natural Sound - *Yamaha's Dolby Surround entry offers unique balanced amplification and processing., $279.*



Dolby System - *AVS351 features surround sound with built-in power amp and compact speakers - from Marantz.*

FRED - *Available for under $150, it offers MTS stereo decoding - from Recoton.*

TV or VCR tuner you may have is not stereo ready this little device includes it's own tuner plus the necessary MTS decoding circuitry. Essentially, the decoder is a separate audio-only receiver.

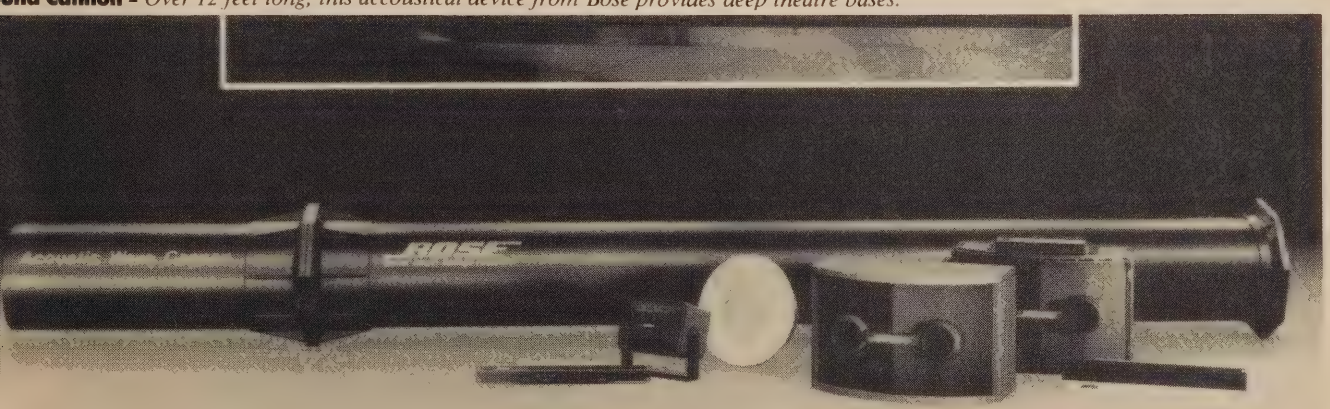
The connection for receiving off the air signals is easy to make. Take the antenna cable already feeding the TV and attach a two-way splitter to it. Then connect coaxial cable (fitted with either twin 300 Ohm or 75 Ohm F-connectors) to one output and run the other end to your TV. Another coaxial cable is attached to the second output on the splitter and connected to the MTS decoder. From here you can then set up the audio output of the decoder. You have the choice of feeding the stereo signal to your stereo system, or if the decoder has built-in amplifiers, through a pair of inexpensive speakers.

The next approach is for those persons connected to a cable system that isn't yet stereo capable, and it doesn't matter if you have a stereo-ready set or not. The first thing you will need is a good set of rabbit ears, or any decent type of TV antenna. By connecting the antenna to the MTS decoder's antenna input you are basically taking the over-the-air stereo audio signal and feeding it into the decoder. The video portion is being supplied by your cable system. Now you can send the audio signal into your stereo system via phono cables and listen to the audio through high fidelity speakers. You will have to change channels on both the decoder and the cable box, but you will be able to receive programming in stereo.

An example of a good external MTS decoder is the Pioneer TX-V1160. This $330 unit not only decodes MTS and SAP information for VHF/UHF, but it also features AM and stereo FM capability. The MTS circuitry built-into the TX-V1160 features automatic stereo/mono switching, and the ability to receive stereo and SAP channels simultaneously. The unit has 12 presets for TV and 24 presets for AM/FM programming, plus an optional wireless remote control.

Now if you want the most innovative MTS decoder take a look at the Recoton F.R.E.D (Friendly Recoton Entertainment Decoder) V622 ($150). The unit does not require that the user play with two channel controls. All the user need do is change the channel on the TV, and the Recoton V622 will select the audio channel automatically. This is accomplished via the use of an RF probe that attaches to the TV set. The RF signal picked up by the probe contains the MTS, and channel information, which is sent back to the V622. F.R.E.D is also available with SAP decoding and a special RF input designed for cable box hookup for $180 (model V623), and with a built-in 12 watt per channel amplifier (model V624) for $200. *Continued on page 25*

und Cannon - *Over 12 feet long, this accoustical device from Bose provides deep theatre bases.*



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Stereo TV *from page 23*

The only unfortunate aspect about this approach is that it will not work with TVs connected to cable systems that are not passing the MTS signal through. However, with those cable systems that are just supplying premium channels such as HBO you can use F.R.E.D for normal over-the-air broadcast channels, and the cable box for premium channels via the use of an A/B switch.

F.R.E.D has other features as well. The unit includes two sets of audio output jacks, with the second designed for use with a stereo VCR for simultaneous listening and recording, thus negating the need for a separate VCR MTS decoder. F.R.E.D also includes a stereo synthesizer that automatically engages for mono programming; an ambience enhancement circuit that improves the image of a stereo signal; DNR (Dynamic Noise Reduction) for mono material; and an MPX input for use with TVs and VCRs that have an MPX jack.

THE VCR SOLUTION

If you like the TV or monitor you already own, and you don't want to spend the extra money for an external adapter there is another way. If you already own a stereo VCR with a built-in MTS decoder you can use your video deck's tuner to deliver the stereo sound. Since the VCR is decoding the signal simply connect a pair of phono cables to the VCR's audio output, and the other end to your stereo system, or stereo video input on your monitor/receiver. When using this approach you will have to change channels on the VCR tuner, and you won't be able to record one program while watching another, but you will have the ability to receive MTS.

SATELLITE RECEPTION

Earth station owners have the ability to get the best stereo reception of all. This is because the satellite dish can receive the stereo signal before it is sent to the TV station. At the TV station the signal is encoded with the MTS information before it's sent out to viewers via the transmitting tower, and this does degrade the sound somewhat. If you own an earth station you will need a stereo satellite receiver to receive the incoming stereo feed. From here it gets a little complicated. Because the MTS information has not been added to the stereo signal you cannot send the output of the satellite receiver to a stereo-ready TV set and get stereo. The pilot frequency that the built-in MTS decoder looks for is simply not there. So what you have to do is connect a pair of RCA phono cables to the stereo outputs of the satellite receiver, and attach the other end to the stereo audio inputs on your TV or stereo system to receive the audio portion of the signal.

There are basically three different types of stereo satellite systems. The matrix system uses two subcarriers. One provides left plus right information, and the other provides left minus right information. When added together they produce stereo. The major networks, the Disney Channel and MTV use this transmission system. Discrete stereo simply uses two channels, one for the right and one for the left, and a companding system for noise reduction. Offerings such as WTBS and the Nashville Network use discrete stereo. Last, but certainly not least, digital satellite stereo is broadcast using the VideoCypher II decoder. All premium services using this system (such as HBO, and the Movie Channel) receive the best audio performance, as digital technology provides up to 75 dB of noise reduction and dynamic range. That's 25 dB better than the other two delivery systems. But it isn't cheap, as the cost of the VideoCypher II is $395.

Self-Powered Speakers - *Perfect for filling in stereo base sounds - from Recoton for under $200.*

If you own an older satellite receiver that's lacking stereo capability you can buy an add-on stereo processor from companies such as Channel Master and Drake. Channel Master offers the model 6142 for $99, or the infrared remote model 6141 for $199. These units include both the matrix and discrete stereo systems.

If you're in the market for a new satellite receiver and you want to save a little money, you can purchase an IRD (integrated receiver/descrambler) for $785 from Channel Master. Model 6441 includes a stereo satellite receiver and VideoCypher II circuitry in a single chassis.

SURROUND SOUND

Finally, if you want the latest offspring from the marriage of audio and video buy a surround sound decoder. This unit will provide you with the ultimate in theater sound—all you need is a separate pair of rear speakers, and in some cases a rear amp, and you can experience spaceships and planes flying overhead, or the sound of wind from behind. Almost all stereo tapes and discs contain this surround sound information, and stereo TV broadcasts are beginning to offer it as well. Inexpensive units that include a built-in rear amplifier include the: Kenwood SC-75 ($235), Yamaha SR-50 ($279), and the AudioSource SS-One ($299).

It isn't very difficult to get inexpensive stereo sound from video sources. All you need is a little planning, a lot of information and a good discount retailer.

How You Can Use Your Old Binoculars To Record Distant Objects

High Magnification

by JIM VINES

If you're into 35mm photography, you already know how much an ultra-long telephoto lens can cost. For those of you who don't, a 1,000mm lens (yielding 20x "image scale" magnification relative to a standard 50mm lens) can cost upwards of $1,000 and in some cases as much as $4,000.

But for a small fraction of these costs you can create dramatic close-ups of sunrises, sunsets, athletic contests, and all kinds of distant scenery. You'll discover new ways of seeing the ordinary and commonplace things of everyday life; and you'll also discover how to communicate a new drama (or even surrealism!) from all of this for others to see.

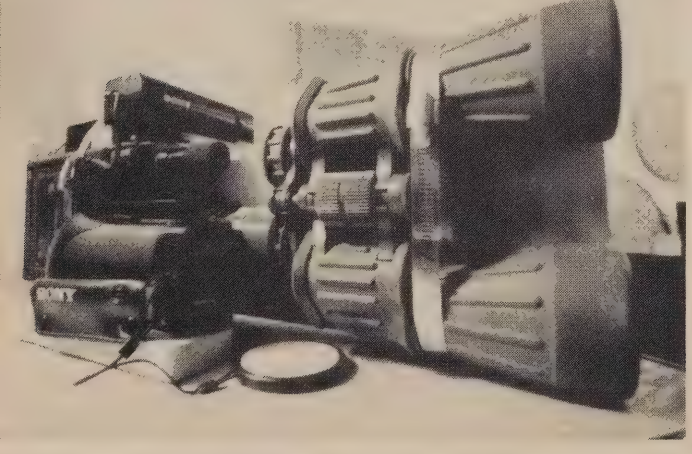
Sunday, March 15. Southwestern breezes swept across the Illinois prairie as I placed a prototype configuration of 8mm camcorder and binoculars across my car roof and aimed at the setting sun. As seen in the Sony CCD-V8's electronic viewfinder, the solar orb was *enormous*. What an awesome sight this would be when played back through by 45-inch Mitsubishi projection TV!

Close scrutiny of the camcorder's viewfinder revealed the slender outline of a distant microwave tower. Although the tower stoon 250 feet tall, it appeared tiny and toylike in front of the giant sun. This visual paradox was possible because the *ratio* of the tower's distance to its height—like the ratio of the sun's distance to its diameter—was about 110:1. And so a structure that stood approximately 25 stories tall was virtually drawfed by the sun!

Behind the tower the sun slowly descended beneath clouds that scarcely cleared the horizon. The clouds, barely visible as a thick black line on the horizon, were later revealed on The Weather Channel to be over northeastern Missouri, 200 miles to the west!

Simple, But Powerful -

Strapping binoculars to camcorder produces telephoto effect.



If you've ever watched the setting sun through a telescope or high powered binoculars, you know how the solar image shimmers as the result of thermal updrafts. The shimmering effect was stunningly visible during the video playback on the giant Mitsubishi television.

Later I dubbed the 8mm video onto both Super Beta and VHS tape, using HiFi/stereo VCRs (a Sony SL-HF400 and a Mitsubishi HS421UR). While dubbing the video I simultaneously dubbed the music from an Ash Ra Temple record onto the Beta and VHS tapes. With top flight audio components to play back the musical soundtrack from the videotape, we found that the addition of the audio resulted in a profoundly enhanced experience.

Monday, March 16. Sunrise was over an hour away. The crescent moon shown low in the southeastern sky. Using the camcorder's zooming control I varied the size of the binocular—magnified moon from between approximately 32x and 48x, settling somewhere around 40x for optimum image brightness and contrast. While somewhat less than the 48x magnification used to capture the previous evening's sunset, this equalled the magnification of a 2,000mm lens for 35mm photography!

Similarly equipped this summer, you might find yourself in the sparsely-populated center field stands of your favorite major league ballpark. From your vantage point 450 feet from home plate you can create the kind of video seen on network TV, where batter and catcher fill the screen. Imagine the priceless pregame videos you'd get of your favorite players horsing around on the field and in the dugout!

Jet planes taking off and landing...Traffic on a crowded Interstate...The Colorado Rockies as seen from across 100 miles of undulating prairie on a clear summer morning. The possibilities of high-magnification videography are unlimited!

Beyond the cost of your camcorder or video camera, what does all of this cost? Binoculars can cost anywhere from $100 to $800 depending on numerous variable factors such as objective (front) lens diameter, the quality of prisms used, and overall mechanical quality. (I am working on an "info-package" tentatively titled *Up Close* which will consider the variables affecting both binoculars and telescopes

Camcorder

for long distance videography.)

The template, made of 3/8-inch plywood, to which the camcorder and binoculars are fastened costs almost nothing. The automotive hoseclamps used to fasten both of the instruments to the template cost $1.29 apiece.

To protect you camcorder's pickup element (be it a chip or a tube) when shooting sunrises, sunsets or any other intense sources of illumination, you must use neutral density filters. I didn't stop there; for when I bought my Sony CCD-V8 at Marshall Field's I also bought the maximum available amount of warranty extension coverage.

Since there are so many different camcorder designs it is impractical to draw a "one-size-fits-all" coupling template. However, most camcorders are designed so their left sides are flat enough to mate smoothly with an appropriately dimensioned coupling template. To protect both camcorder and binoculars from scratching under the pressure of a tightly-drawn hoseclamp, it would be wise to place cardboard or thin leather at all pressure points.

Calculating magnification. Suppose you've set your camcorder's zoom lens to its maximum magnification (typically 6x) and suppose also that the binoculars you have aligned it to have a magnification of 7x. The resulting total magnification will be 42x. The "angular field coverage" will be roughly 0.7 by 1.0 degrees. Since both the sun and the moon are 0.52 degree in angular diameter as seen from our Earthly perspective, each will occupy a substantial portion of your binocular-camcorder's angular field coverage. And that, Dear Reader, translates into a mighty big sun or moon on your TV screen!

Unlike the human eye, the typical zoom lens cannot see the entire field of view of a telescope or pair of binoculars. The nodal point of your camcorder's zoom lens is rather far behind the exit lens of your scope or binocular. To obtain a video display out the corners of my TV screen, I must operate my camcorder's 11.5mm-70mm zoom lens at the 60mm (5x) focal length, or longer.

"Night" binoculars work best with camcorders. First, their large "exit pupils" reduce or largely mitigate the shadowing effect of the camcorder's built-in light metering system. For instance, when I coupled my camcorder to a 20x40mm spotting scope (exit pupil=2mm, obtained by dividing the scope's objective lens diameter of 40mm by its magnification of 20x), there was an annoying center spot in all of my recordings. This spot was softened considerably when I tried my favorite pair of binoculars, a pair of 9x35mm Bausch & Lomb's, whose exit pupil diameter was 3.9mm.

The "exit pupil" we've been referring to is the tiny circle of light seen in the rear or "exit" lens of a pair of binoculars held away at arms' length. Given a larger diameter objective lens and *no increase in magnification*, you can shoot with less light. A large objective lens captures more light, and the result is a larger exit pupil as seen in the binoculars when held at arms' length.

On March 15 and 16 I achieved my best results to date with a pair of Tasco 8x56mm binoculars. Optically good but handicapped by a sloppy focusing mechanism, these binoculars rendered a full 7mm exit pupil; and as the accompanying videos show there is no central spot or shadow.

Ordinary daylight (on a sunny day) is sufficient to cause the camcorder's zoom lens to "stop down." The result is a form of "tunnel vision," with the video display being reduced to a small circle. Outside of the circle and out to the corners of the TV screen everything is black. A 4x or 8x neutral density filter will prevent your camcorder's light meter from stopping down the zoom len's diaphram. By the time this goes to press, I'll have fine tuned my recommendations for sunrises and sunsets; but for now I would suggest using an 8x and a 4x ND filter in series for a normal yellow-orange sunset. The resulting total "filter factor" would be 32x.

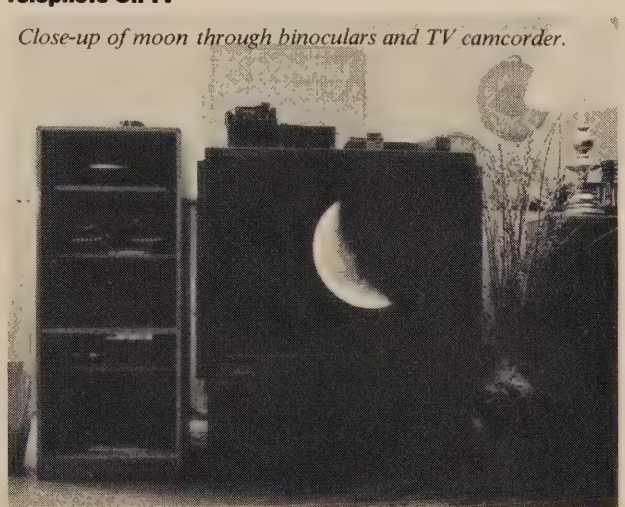
My initial experiments (or demonstrations, as they've become) have been done with the filters between the camcorder's zoom lens and the binocular's eyepiece. By the time you read this I'll be using filters in front of the binocular's objective lens, which will facilitate faster filter changeovers. I'll also be using colored filters to capture or even create the mood of a scene, just as I often have as a "still" photographer.

We've just skimmed the surface of high magnification videography. New artistic challenges lurk on your horizon and up in your sky.

NOTE: Inquiries to Jim Vines about his ongoing experiments in long distance, high magnification videography should be mailed with stamped, self-addressed envelope to him at P.O. Box 448, Monee, Illinois 60449-0448.

Telephoto On TV -

Close-up of moon through binoculars and TV camcorder.



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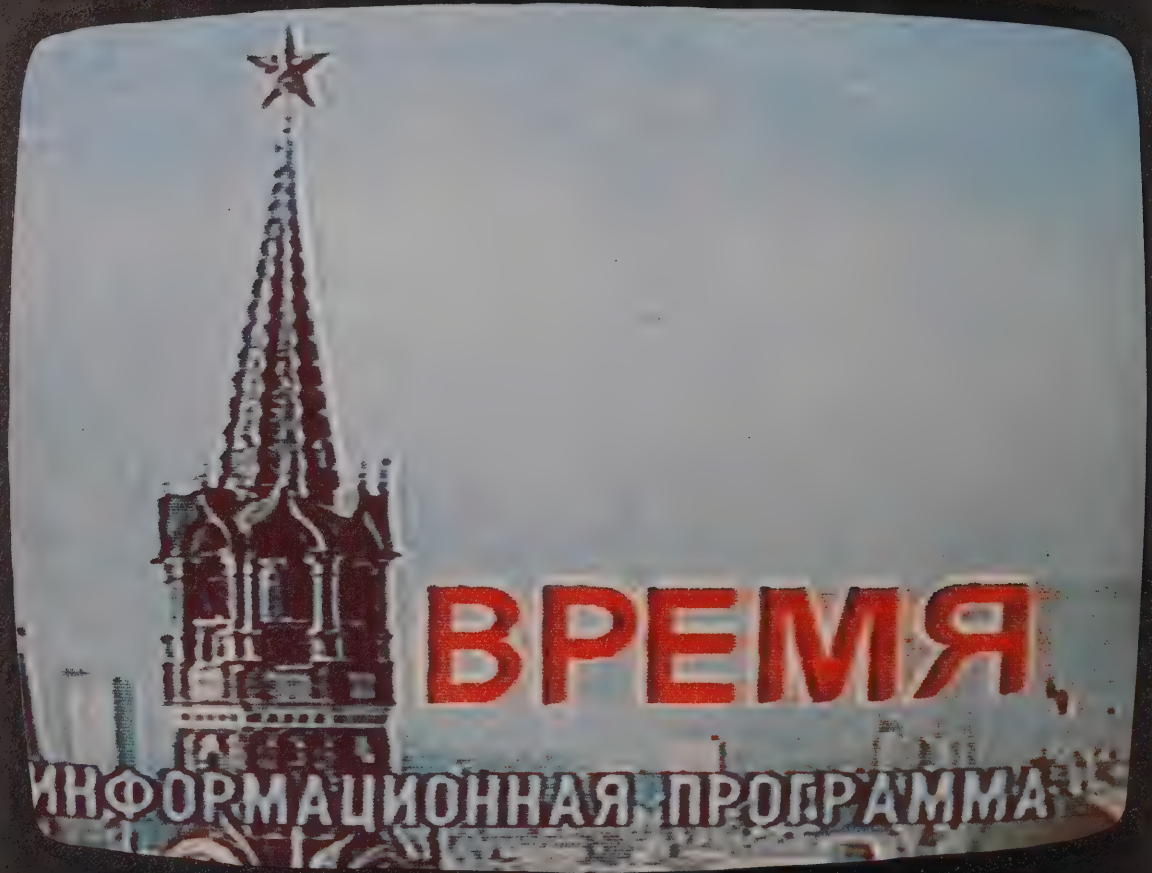
ТАСС СООБЩАЕТ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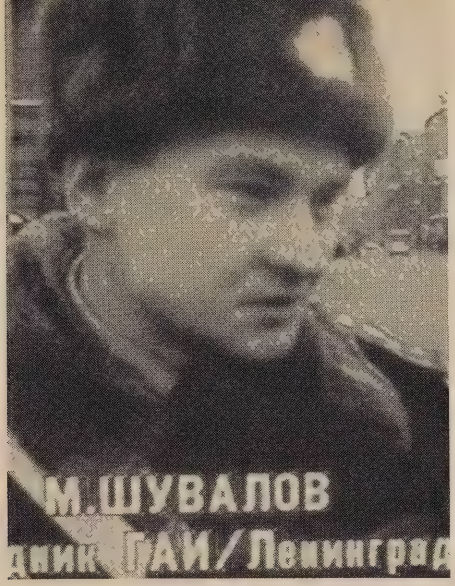
ИНФОРМАЦИОННАЯ ПРОГРАММА



Tuning In MOSCOW

How U.S. Videophiles Are Watching Soviet Programs On The Molniya Satellite

by CARL SANCHEZ

Question: What country has 11 time zones?

Answer? There is only one answer—the Soviet Union. In some parts of the world's "widest" country the sun sets before it has risen in other parts of the country, all in the same day!

For television this presents unique problems. To understand them consider the three basic time zones in the U.S. It often takes two satellites (one on the east, the other on the west) to cover the United States.

Now consider what would happen if the U.S. had the 11 time zones of the Soviet Union and you immediately see some of the problems facing Russian television. How to get the entire country bathed in TV transmission (even the rural hinterlands) at the appropriate time?

The Russians began work on the problem shortly after the launching of satellites first became a possibility. (Remember, the Russian's launched the world's first artificial satellite with Sputnik I.) Their answer came in 1965 when they launched four Molniya (Flash) satellites.

The Molniya birds, however, did not follow the "Clarke belt" (22,300 miles above the equator) that virtually all U.S. birds follow. Nor did they have geostationary orbits. (They didn't remain in place above a certain point on the earth.) Rather, they followed a strange elliptical orbit that took them over various parts of the world including the United States and Canada.

To understand why, one only has to remember that virtually all of Russia is in the far northern hemisphere. In addition to making this a long way from the equator and the Clarke belt, it also means that the Russians (at least until the mid 1970s) really didn't have any good locations for launching geo-

Good Morning From Moscow! *The Russians have their own satellite system and broadcast TV programs remarkably similar to our own (without advertising, of course!) Above photo was taken by eavesdropping on the Molniya satellite and shows an announcer reading a Tass report on the U.S. Bottom photo is the introductory shot to Russian "informative programming."*

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Television

March 29

CHANNEL ONE. 7:00—Morning Exercises, Cartoons and Music. 7:30—Time. 8:05—"The Sky is Reflected in Each Faint Note." Program from Frunze. 8:30—Rhythmic exercises. 9:15—"Sport Lotto." 9:30—"Alarm Clock." 10:00—I Serve the Soviet Union! 11:00—"Morning Mail." 11:30—Vocation. Telejournal. 12:00—Second All Union Folk Arts Festival. 12:30—Musical Kiosk. 1:00—Rural Hour. 2:00—Health. 2:45—"Comrade Song." 3:35—"In Jest and In Earnest." Satirical program. 4:20—"They Don't Fool Around With Robots." Feature television film. 5:40—Cartoon. 6:00—International Panorama. 6:45—"For You, Veterans!" Musical program. 7:30—Film Panorama. 9:00—Time. 9:40—"Seventeen Moments of Spring." Feature television film. Part 7. 10:50—Soccer review. 11:35—News.

CHANNEL TWO. 8:00—Exercises. 8:20—"The Third Side of the Coin." Feature film. 9:35—From the Treasure House of World Musical Culture. I. Stravinsky. 10:10—Russian language. 10:40—Program of Latvian television. 12:00—World and Youth. 1:00—Human Institute. Man and Woman. 2:00—Cartoon. 2:30, 8:15—Gymnastics. 3:15—Plays of Anatoly Efros. "Islands in the Ocean." 6:00—Soccer. Spartak vs. Ararat. 7:45—"If You Want to Be Healthy." 8:00—"Good Night, Little Ones!" 9:00—Time. 9:40—"Theo Adam Invites You."

MOSCOW CHANNEL. 7:00 p.m.—"Moscow Area Meetings." Agricultural workers' holiday in Odintsovo Region. "Wires of Russian Winter." 8:30—"Swifter Than the Wind." Documentary television film. 8:45—"Good Night, Little Ones!" 9:00—Time. 9:40—Poetry Today. V. Kostrov. 10:10—Advertisement. 10:25—Concert film "Stage Characters and. . ." with K. Raikin. 10:45—Moscow news.

LENINGRAD CHANNEL. 4:55—"Cartoon Lotto." 5:05—Vocal evening with V. Pankratova. 6:00—"The Former Semenovsky Parade Ground." 6:20—"Drawing." Song lottery. 7:10—"Group Portrait With Kuzhes." Documentary film. 8:00 and 9:40—Final concert of the Leningrad Festival of Young Pop Singers. 9:00—Time. 10:40—"Monitor."

Official TV Guide - *Molniya programming reprinted and translated from Pravda.*

High-Tech Dish - *Controlled by computer, Marriner 16 footer moves both vertically and right to left to track Molniya.*

Moscow

stationary birds. As a result they originally chose an eccentric orbit in which the satellite at first moves rapidly across the surface of the planet, then spends a good deal of time over almost fixed points. It's as if first the bird races ahead of the earth, then pauses, then plays catch-up.

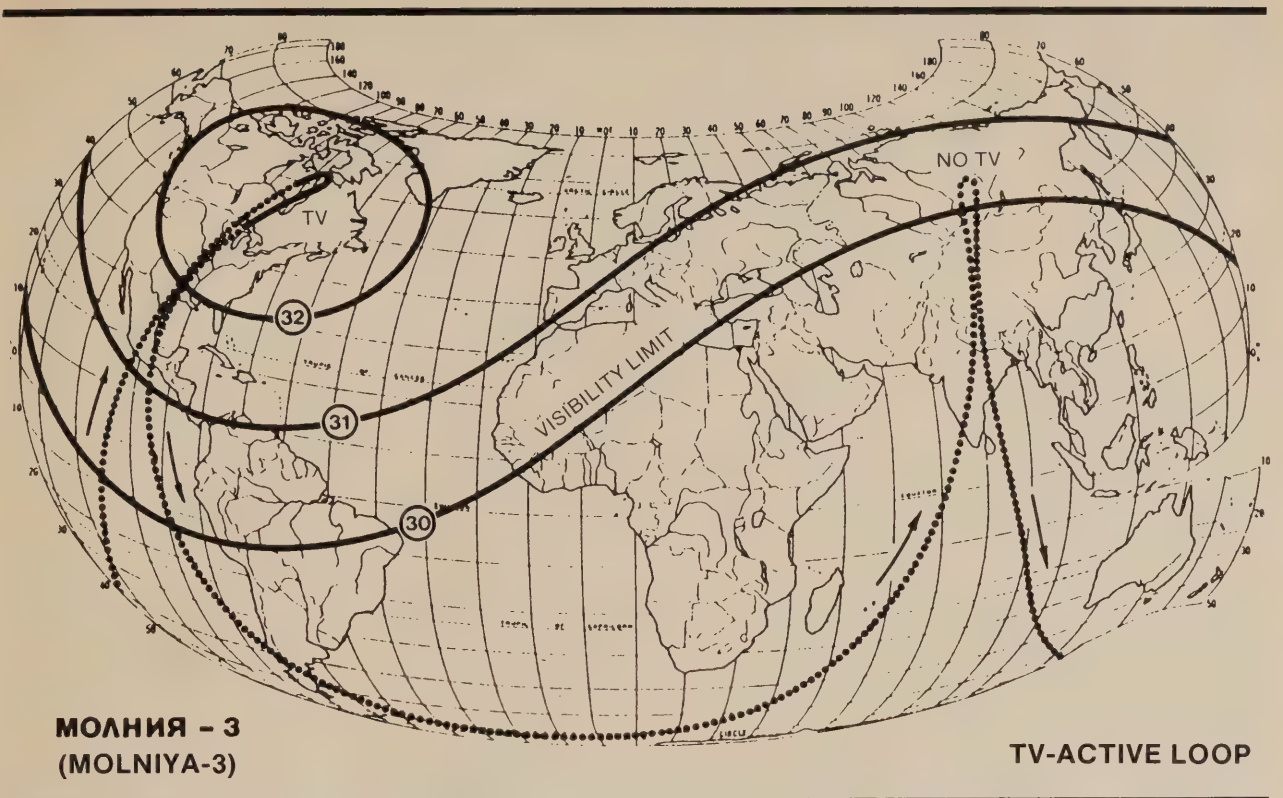
The result is at least one of the birds, Molniya 3, has an orbit with two almost stationary positions over the northern hemisphere, one over middle Canada and the other over Eastern Russia.

Also, unlike western satellites which uplink (receive) and downlink (transmit) almost continuously, Molniya 3 is essentially turned off during most of its trip over North America. It is turned on only for six short hours (all of it over Canada) during which it broadcasts to the Soviet Union. It is during this time that Canadians and Americans have begun snooping on Russian television.

Listening in on Soviet television is like getting the information "from the horse's mouth." Unfortunately, it's not something that the average home dish viewer can accomplish for a variety of reasons. Today, American and Canadian viewers are primarily those in Universities and in government. The problems with receiving signals from Molniya begin with the dish size requirement. Your backyard six footer simply will not do. Sixteen foot dishes and larger are standard for top reception.

Once you have the dish, there's the problem of aiming it. This is the trickiest part of the whole reception process.

With normal dishes aiming is fairly simple (although home satellite users who have had trouble getting their dishes focused are certainly disagreeing here!). With a normal dish, focusing is theoretically just a matter of placing a pole perfectly vertical in the ground, getting the mount coordinated with the earth (a polar mount) and then focusing at a satellite that is apparently standing still near the horizon. In theory you could just hold the dish, aim it at the bird and you'd get reception. (According to Hughes Communications, the government has a satellite receiver for the Army that works just like that!)



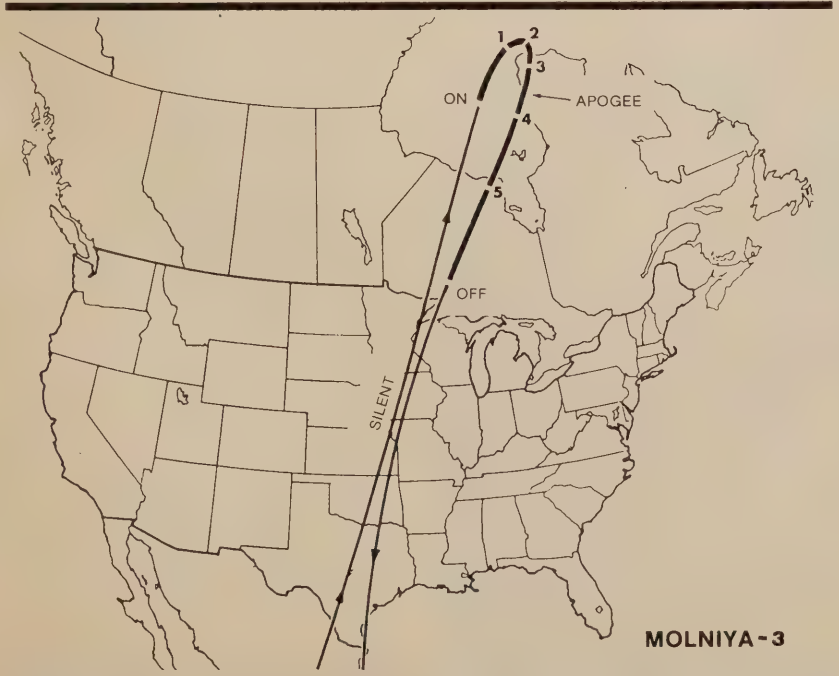
Eccentric Orbit - *Molniya (dotted line) seems to seesaw across planet—solid lines are its footprint indicating signal strength.*

The only complication comes when we want to move the dish to a different bird. For this we need a device to track across the horizon (since all of our birds are in the same fixed orbit around the globe.)

This is accomplished using either a linear or a horizon-to-horizon actuator. It simply rotates the dish left or right. With the birds stationary over the equator, it's just a matter of aiming and holding the dish position.

Now consider the Soviet Molniya. It isn't stationary. Rather, it's in an

Transmission Loop - *Molniya downlinks signal 6 hours while over northern Canada.*



the equator and the Clarke belt, it also means that the Russians (at least must similarly bob and weave. It must, in fact, duplicate the bird's orbit.

It's as if we were trying to focus a dish on Galaxy 1 (one of the most powerful of our birds) and instead of it staying in one place, it was continually on the move. How could we follow it?

A standard dish could follow it across the horizon, from left to right or back. But that's not the kind of orbit Molniya takes. It not only goes east and west, but north and south as well.

Thus, our dish must not only move right and left, it must also move up and down. The real trick, of course, is to coordinate all this action into a steady movement that follows the satellite without getting off one way or another. To be off even a fraction of a degree means that we've lost the focus.

To begin we need a whole different kind of mounting device. The type used is probably unlike any kind of mount you may have seen before. At the place where the dish attaches to the pole is a kind of horizon-to-horizon mount only instead of being horizontal, it's vertical. It lifts and lowers the

Continued on page 32

Russian News - *Interviewer questions Daniel Ortega, Nicaraguan Communist leader.*

Russian Basketball - *Sports break features favorite western games.*

Woman On the Street - *Interview with a student of the Moscow Conservatory.*

Moscow *from page 31*

dish. This allows us to control its elevation.

The pole itself is connected to a separate mount which swivels in a circle. Thus, the mechanism allows the operator to move both the dish's elevation as well as its direction. In other words, the dish can be aimed at virtually any point it can see.

Of course, now comes the real trick —the tracking. Having the mechanics is one thing, getting them to function to produce a picture is quite another. This is more than any mere human could do, consequently, it's done entirely by computer.

A program has been written which moves both the elevation and the direction of the dish in a manner that exactly corresponds to the strange Molniya orbit. As a result, the dish is ready to receive whatever the Soviets transmit.

Thus, when the Russians turn on Molniya far over northern Canada, a number of dishes in North America are tuned in and eavesdrop on Soviet TV. The photos accompanying this article are some of what they see.

Currently, the state-of-the-art tracking system is produced by Merrimac Satellite of Merrimac, Wisconsin. Bart Olson, President of Merrimac notes that their system, "Unlike any other system, is capable of geostationary C and Ku band reception in addition to Molniya tracking." The Merrimac System is also capable of tracking the Russian geostationary satellite Gorizont which continuously wanders in a figure eight pattern across the equator making it impossible to track using a standard nontracking mount. Gorizont can only be viewed from the east coast.

The Merrimac System consists of a 16 foot mesh dish with two motor drives. The signal is cabled into a control center where a computer system takes care of focusing. Designed primarily for institutions, the system retails for $14,000.

(Russian TV programs reprinted from Pravda, English Translation, Associated Publishers, Inc., 2233 University Ave., Suite 225, St. Paul, MN 55114. Tracking diagrams reprinted from *STTI's International Television Reception Guidebook* by Stephen J. Birkell.)

Make Your Own Big Screen TV

If you've always wanted a big screen TV, but never could afford more than a 19 inch set, you may be in luck. A new product allows you to turn your old 19 inch tube into a gigantic six foot screen.

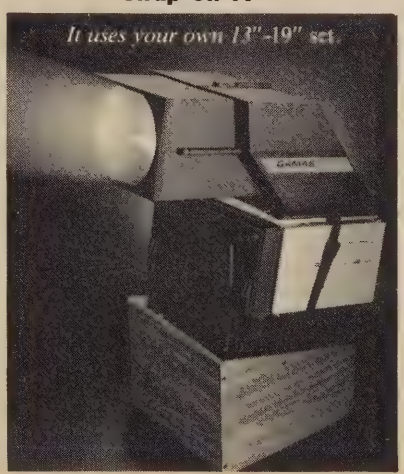
The premise is simple. If you own a color (or black and white) TV you already have the basic parts of a wide screen set—the tuner, the screen and all the electronics. The only thing that you lack is the lens system that allows the blow-up of the picture.

The GAMAS 2000 supplies the missing link. It incorporates a twin lens system that enlarges the image from your old TV screen and projects it onto a screen. It works, in fact, much like the projection system in a standard TV theatre.

The GAMAS 2000 will operate with any TV set from 13 inches to 19 inches. Its operation is simple.

You place your old set in a vertical (instead of a horizontal) position so the screen is aimed upwards. Then the GAMAS 2000 is secured to the set by means of a strap. Once securely in place, the TV can be turned on. The TV picture enters the bottom of the GAMAS 2000 unit, goes through the two enlarging lenses and is then projected.

Strap-On-TV -



The real question with the GAMAS 2000, of course, is what quality of picture do you get on the screen? That depends, in large part, on the quality of your old TV set. The GAMAS 2000 won't turn a weak set into a super TV. In fact, it tends to make the defects of the old set stand out.

If you old set is very sharp with a strong bright picture, then you're likely to get a satisfactory projection. On the other hand, if the old set is on its last legs and the picture quality and brightness are poor, then the projected image may not be to your liking.

The GAMAS 2000 represents an attempt to bridge the gap between high cost projection TVs and the average person's pocketbook. Its suggested retail is $159 without screen and $199 with screen (price includes base). (SGS Electronics - 201/784-9200.)

Wozniak's New Toy

A Programmable Controller From The Father of the Apple

Remote controls are wonderful. You can have one for your TV, another for the VCR, yet another for the satellite receiver, perhaps one for the stereo and on and on.

The problem, of course, is that after awhile having all these remotes becomes a problem. You press the button on your remote to turn on the TV and find that the VCR starts playing. Then you search for the VCR remote only to discover that the kids were playing ray gun with it and it's no where to be found. Or even if you do find the remote, you know it can't help if you want to record something off your satellite receiver next week and the receiver doesn't have a timer.

In our age of high technology, the remote control unit is both a blessing and a real pest. Until recently, that is.

Last year General Electric announced its Control Central which allowed one remote to operate up to four different unrelated products. The GE unit even could "learn" the remote control signals for almost any infrared unit. You just placed the old remote in front of the GE and pressed corresponding buttons, "Channel Up," for example. The GE unit "learned" the correct signal from your original remote.

GE's Control Central was definitely a step forward. Then, late last year, Magnavox came out with a competing product. It, too, could control a number of different units.

But now, we have the ultimate in remote master controls. It's called CORE and it comes from none other than Steve Wozniak.

Wozniak was the genius behind Apple computers. He helped design their original computer and many of their subsequent models until retiring from the company.

Wozniak has since formed his own company, CL9 in Los Gatos California and one of their first products, CORE, is his brain child. He conceived, designed and built the product.

CORE goes light years beyond any current remote control unit. It's built-in microprocessors and real-time clock allow it to not only control any home electronic products that you have (which are equipped with infrared remote), but it also allows you to program them so they will function completely unattended! You can use it to record a premium channel movie that appears next month!

It can be programmed, for example, to turn on your satellite receiver and move it to the appropriate bird and transponder. Then it can turn on your VCR and have it record a show at the precise time it's broadcast from satellite. Finally it can shut everything down. Best of all, you don't have to be anywhere around for it to do all this!

According to Wozniak, "CORE will replace all the remote controllers on the market because it has features others don't. It is truly programmable."

The programmability of CORE is

CORE - *It interacts with virtually any infrared controlled home electronics product operating the TV, stereo, satellite dish, VCR, CD player, appliances and security systems - and its programmable for months into the future!*

possible because of the unit's macro-entry feature which allows the controller to execute long series of commands with the touch of a single key. As many as 260 series of tasks can be called up in an instant. When this is combined with a real-time clock, Macro-entry allows the user to program events far into the future and provides a time control for home electronic products that do not have one.

The internal brainpower, using two microprocessors and a relatively large RAM (Random Access Memory), contributes significantly to the ease and simplicity of operation and programming and enables the user to enter and use more programs. The plug in/snap out Master Module contains the infrared signalling that interfaces with all of a home's infrared remote electronic units - regardless of brand — and generates a higher-energy, more dispersed infrared signal than most conventional remote controllers.

In terms of drawbacks there only seem to be two. First, in order to operate your home electronic product must itself have an infrared remote. CORE won't work with products that don't have infrared.

Secondly, you must yourself program the unit. Obviously this product is going to be more for the tinkerers than for the person who just looks for the ON/OFF switch.

Fortunately, however, Wozniak has made programming of the unit extremely simple. Even a klutz can do it.

To help with the programming, the manufacturer provides an excellent reference book and journal. With these and the 12 program keys hidden in the base of the unit, programming is surprisingly easy. The journal, in particular, allows for the development and record keeping of template programs, for the most often used sequences. Minor revisions in complex programs can be achieved using just one or two program keys, rather than having to redo the entire program.

CORE has a suggested retail price of around $200. It includes an interface oracle to permit communication with CORE via telephone and additional Master Modules to allow radio frequency remote control.

by MARC WIELAGE & ROD WOODCOCK

DID YOUR VCR

If You Care About The Perfect Picture, You Will Have To Convert To New Super VHS

Every harried consumer who has ever steered a wobbly-wheeled grocery cart down the aisles of a crowded supermarket knows the glitzy superlatives of the mass market all too well. One product is "New", while another may be "Improved" while still others are "New and Improved" all at the same time, just in case you missed the point.

"Super" is a superlative that's saved for really earth-shaking improvements, and Super VHS, or "S-VHS" as it has come to be known officially, certainly deserves its name.

When the announcement of the new format came in early January (awkwardly coming during the middle of the Winter Consumer Electronics Show, when many dealers had just finished placing orders for standard VHS machines), its reported capabilities were so impressive, that some members of the press were initially skeptical that it could perform as well as JVC said it would. Now that more is known about the format, we can report that S-VHS is as good as they claim, at least twice as good as the picture quality of standard VHS VCRs.

The standard VHS system, which dominates the consumer video market with sales of camcorders and table-model VCRs swamping Beta and 8mm VCRs, offers adequate, but by no means impressive picture quality, usually delivering 230 to 240 lines of resolution. S-VHS, by contrast, offers a horizontal resolution of nearly 430 lines, far more than any current consumer VTR, and coming close to the quality of the professional one inch VTRs used by TV stations and other professional broadcasters.

While early reports of S-VHS erroneously indicated that the new format was recording the color (chrominance) and black and white (luminance) components of the TV signal as separate elements (the way many broadcast VTRs work), it's now known that they've really just applied the same techniques that Sony used two years ago when they introduced their "SuperBeta" system.

Both VHS and Beta use similar methods to record a TV signal. The color component of the signal is recorded as a lower-frequency AM signal and is multiplexed on top of the luminance carrier. To achieve their SuperBeta system, Sony boosted the position of the chrominance signal 800 KHz into the luminance signal. More recently, they moved it upwards by another 400 KHz, to yield the 6 Megahertz "Super Hi-Band" system that's in their latest SL-HF1000 Betamax.

But S-VHS has managed to leapfrog over High-Band SuperBeta, albeit by using almost identical techniques. With standard VHS, the frequency deviation of the color signal VHS is 1 MegaHertz, positioned between 3.4 and 4.4 MHz of the luminance spectrum. In contrast, S-VHS has a frequency deviation of 1.6 MHz, positioned between 5.4 and 7 MHz. In addition to moving the color carrier higher up into the luminance spectrum, both S-VHS and Super-Beta haved pared down the width of the video heads. Currently, High-Band Beta uses 27 micron video heads, while S-VHS will be using 20 micron heads.

Still another part of the S-VHS equation is a new high resolution videotape such as Fuji's just-announced Beridox SHR, which offers a magnetic energy that's 80% higher than any current high-grade tape. It was this tape that JVC used for their first deomonstrations of the S-VHS system in Tokyo, but it's expected that every name-brand tape manufacturer will eventually be selling the specially formulated S-VHS tapes.

S-VHS is so much of an improvement over the current format, it actually exceeds the capabilities of the existing broadcast system and few of the current generation of TV's or monitors can match its high resolution performance. For that reason, JVC is developing a line of new monitors that will have separate inputs for the luminance and chrominance signals, complementing similar outputs that will be found on all S-VHS VCRs. Getting the most out of an S-VHS machine, therefore, will depend on many factors, including the quality of the signal being recorded, as well as the resolution of the monitor being used as a display device.

Buying a new S-VHS VCR, in other words, won't be enough to give you all of the improved resolution that the format is capable of. For maximum picture quality, you'll need a new monitor as well, fitted with the combined luminance/chrominance "S" terminal that JVC is building into a new line of monitors. Monitors with similar jacks will also be available from other manufacturers, including Sony.

If JVC's marketing strategy pays off, sales of S-VHS VCRs, which they expect will give the format a new lease on life and ensure the format's popularity for at least another decade, will lead to a corresponding increase in sales of the new Y/C monitors. JVC expects that S-VHS will pave the way for a new generation of Extended Definition hardware and software. Extended Definition, by the way, shouldn't be confused with High Definition TV, which uses a completely different 1125 line system. HDTV, which is really designed as an improved broadcasting system, is still some years away, owing to difficulties in obtaining the necessary standardization agreement from all of the participating countries. Extended Definition TV, on the other

JUST BECOME OBSOLETE?

Is Your VCR Obsolete?

hand, is designed to maximize the capabilities of the existing NTSC system.

Needless to say, in the see-saw battle for the claim to making the "best" video format, Sony was quick to announce a high resolution improvement to their Beta format, and in mid-March they unveiled "Extended Definition Beta" or ED Beta for short. To achieve an even higher resolution 500 line system, Sony moved the position of the color subcarrier even higher into the luminance spectrum, so that it now tops off at 8 Megahertz; one Megahertz higher than S-VHS, and a full two Megahertz beyond the existing "High Band" Beta system, unveiled just last fall.

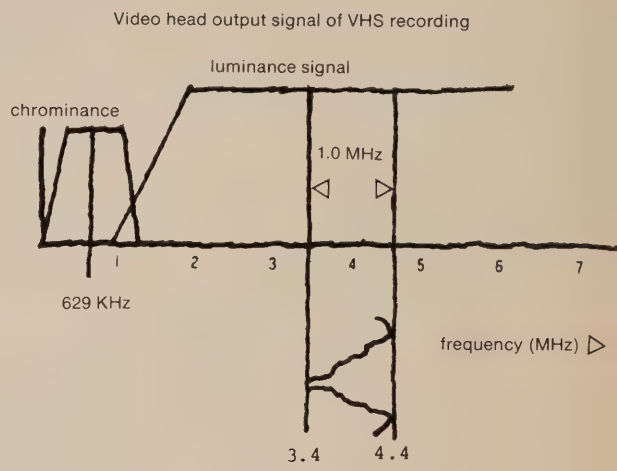
But to deliver that kind of high-resolution performance, Sony's new ED Beta needs to use metal particle tape, the same kind that's now available for 8mm decks, and which offers higher magnetic energy. But metal particle tape can't be used on conventional Beta decks, since the video heads have to be optimized for use with each kind of tape. S-VHS, on the other hand, will use an improved cobalt-ferrite tape that will be useable on standard format VHS VCRs, although you'll still need to use an S-VHS VCR to obtain the best quality.

Both systems will be previewed by dealers and the press at the forthcoming Summer Consumer Electronics Show in Chicago, but the implications for a new era of high resolution home VCRs has already begun to send tremblors through the entire video industry. It's estimated that more than 40% of U.S. homes now have a VCR, and more than 90% of those are in the VHS format. It took more than a decade for that level to be reached, and inspite of the improvement in picture quality offered by S-VHS, that established base of standard VCRs won't be threatened by S-VHS. For many owners, a VCR has become just another home appliance. As long as their VCR can play the movies they rent, or record their favorite soap opera, they'll hang on it. And if and when it finally breaks down, they may not necessarily replace it with an S-VHS machine, especially if these new models are destined to sell at a premium price.

The medium and low-priced VCR market, where prices are consistently below $300 and often dip beneath $200, won't be threatened by S-VHS, at least not in the immediate future. But even if the less discriminating video buff won't be prepared to pay the extra money to own an S-VHS VCR, the same certainly won't be true of the more affluent, upscale videophile. The high-end VCR market has been languishing in recent years, as manufacturers seemed to be running out of exciting new features to add to their flagship models, where prices above $1000 (even at discount) are common.

S-VHS and ED Beta will find enormous appeal with this

Recording Signal Spectrum

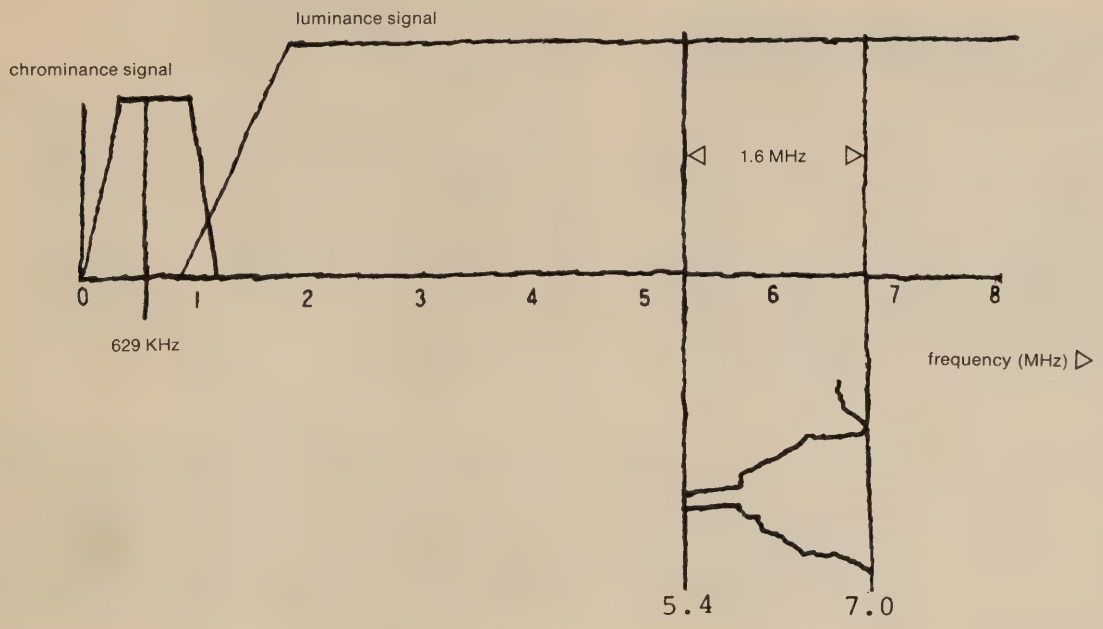


more demanding group of buyers, and once they discover that the existing broadcasting system can't fully tap the potential of their new VCRs, they'll be looking for a supply of S-VHS prerecorded software that can make the most of their new VCRs and monitors. On paper, at least, S-VHS and ED Beta offer video quality that's even better than Laserdisc, which up to now has often been the format of choice for movie collectors looking for high quality audio and video. Unless Pioneer and the other Laserdisc manufacturers can also come up with an improved, higher resolution format, they may begin to lose market share to a new generation of S-VHS software.

A decade ago, when the home video software industry was in its infancy, the folks who opened up video rental stores were eagerly looking for ways to expand their business. Improvements in the quality of VCRs, and the introduction of popular features like picture search and Hi-Fi sound, were welcomed as long as they helped sell more VCRs. But nowadays, with a video rental store on virtually every street corner, software dealers have become more conservative and a powerful force within the industry. Just as most of them have eliminated the nuisance of a two-tiered VHS/Beta inventory situation, (and few of them have added any of the new 8mm software, which remains a "special order" situation for many dealers) they may not be enthusiastic about the prospect of seeing it return, with the need to keep in stock duplicate titles in both VHS and S-VHS formats.

Other problems may surface as well. S-VHS is not downwardly compatible, and while you can play standard VHS tapes on an S-VHS VCR, an S-VHS tape played on a regular VHS machine will deliver an almost totally unwatchable picture. But while the S-VHS VCRs will make use of a "recognition" hole that's already provided for in the design

Video head output signal of S-VHS recording



of all VHS cassettes (there are actually two of them on the bottom of the cassette shell, but JVC has not indicated as yet which of them will be used to tell an S-VHS VCR to turn on its high resolution circuitry), it will still be possible for a consumer to inadvertently insert an S-VHS cassette into a standard VHS VCR. Given the minimal technical knowledge of many video rental operators and their customers, one wonders how a dealer will explain to a customer why a movie cassette of his favorite movie that's labelled "Super," won't be playable on the plain-Jane VCR he's been nursing along for the last five years.

The maturity of the mass market appeal of video software has already spawned a boom in the release of many public domain movies, with many titles duplicated at the LP or SLP speed, compared to the higher quality SP speed used by the major companies. But S-VHS, it's claimed, can deliver picture quality at its EP speed that's clearly better than the SP quality of standard VHS. If that's the case, software companies may be tempted to duplicate movies at this tape-conserving slow speed, in lieu of the even higher-quality SP speed.

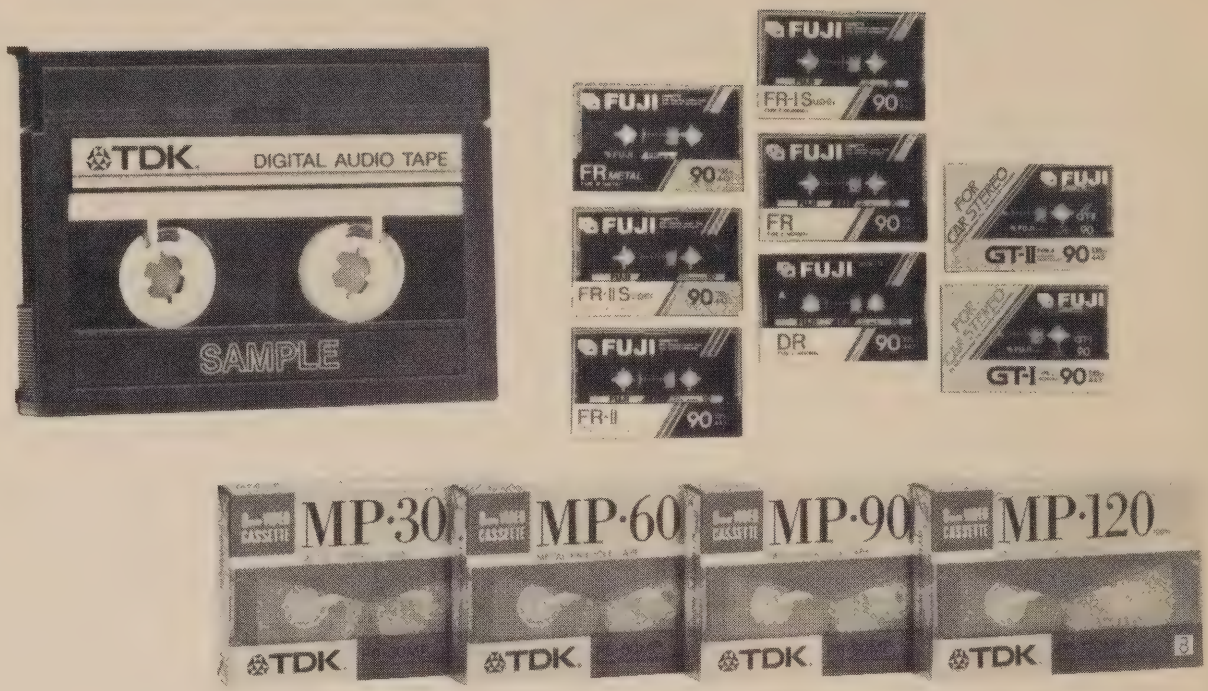
But even if S-VHS EP approximates todays VHS SP, the faster speed will still offer even better picture quality, and most consumers will probably insist on SP-only software, in order to maximize the viewability of the tapes that they view on the S-VHS machines. In addition, while S-VHS may offer an immense improvement in picture quality over the current format, it's not expected that any new technology, such as automatic tracking (found in the 8mm format) will be introduced as part of the format.

Recordings made at the slow EP speed, therefore, may still not playback well on other VHS machines, owing to the narrower tracks they use, and while this may be a popular speed for time-shifting programming in the home, where the tape is recorded and played back on the same VCR, the SP speed should remain the standard for pre-recorded tapes.

Super VHS will have made its presence felt in other areas of the video market as well, influencing the choice of equipment for industrial and professional users. Ever since the first VHS and Beta VCRs appeared in the mid-seventies, it has always been conceded that the larger 3/4 inch tape format provided better quality, and for that reason has been widely used by TV stations for their "ENG" work (Electronic News Gathering). But S-VHS has vaulted over 3/4 inch in terms of picture quality, and may even put pressure on some of the newer 1/2 inch broadcast formats such as Betacam and M-II, which cost much more to buy and maintain.

When S-VHS was announced, it was assumed that Sony would eventually announce an improvement to their competing Beta format, and in mid-March, they unveiled ED Beta. But despite its higher quality pictures, Beta remains a virtual non-entity in the consumer marketplace right now, which is dominated by VHS. On the other hand, the 8mm format, with its smaller cassette, Hi-Fi sound and longer playing time, are making it a more attractive format for camcorder buyers. It remains to be seen whether video engineers can re-work 8mm as well, in order to deliver a "Super 8mm" format (gee, that sounds familiar) that can compete with S-VHS.

Obviously, the development of Super VHS, apart from being a breakthrough in video quality, has churned up the video market in many ways, raising lots of questions as to how it will co-exist with standard VHS, and its influence on other competing formats like 8mm and Beta. This is a story that's just beginning. Look for continued updates in future issues of Super Television.



The Confused Consumer's Guide To

by FRANK VIZZARD

After the hardware comes the software. That might sound like a line from a computer training course, but the truth is that the "software" you use in your home entertainment system should be given as much consideration as any used by a computer. Whether it be for audio or video purposes, tape is the primary software for home entertainment.

While the compact disc might have given some people the impression that tape was becoming a medium of the past, there is little doubt that tape will be around for some time to come. Tomorrow's tapes, however, will be vastly improved versions of today's cassettes.

In audio, for example, the cassette invented by Philips of the Netherlands and which we are all so comfortable with, is about to get some competition. Digital audio tape (DAT) is a new medium that offers the sonic performance of a compact disc. Unlike CDs, though, you can record on DAT. Already on sale in Japan, DAT machines are expected to be on the U.S. market in the near future.

Compared to a standard audio cassette, a DAT cassette is about half the size. You should not be fooled by DAT's small size, though. Tape generally relies on metal particles bonded onto the tape to record an audio signal. The greater the number of metal particles fitted uniformly onto the tape, the better the recording will be. DAT cassettes developed by companies like Fuki, TDK and others use ultra-fine metal particles for greater density. The tremendous density of metal particles means the tape will retain more of the signal information.

Additionally, these metal particles are packed onto a thinner tape, a fact which contributes to DAT's smaller overall size. A DAT cassette capable of making a 120 minute recording will probably become as popular as today's 90-minute audio cassette. A DAT cassette can hold four times the information contained on a compact disc. DAT can also record information other than audio signals as well, such as hours, minutes, seconds, title numbers and other data.

DAT also differs from the standard audio cassettes in its construction. Unlike the audio tapes with which we are all familiar, a lid with two slider locks in a torsion bar system covers the tape face so that contaminants are prevented from entering the cassette. This technique is very similar to the method used on video cassette tapes. DAT machines, in fact, operate much like video cassette recorders. When a DAT cassette is inserted into the machine, the lid opens and then the tape is wound around a rotary head. As the tape is wound onto the "drum" the recording/playback heads mounted on the drum are placed against the tape for record-

Matching the "Software" To Your Home Entertainment Center

Video And Audio TAPES

ing. Accidental erasure and recognition holes are located at the rear of the bottom of the cassette.

DAT is likely to be a recordist's medium—at least initially—if only because of the dearth of pre-recorded titles. Only small audiophile lables like GRP have yet released pre-recorded titles. DAT machines will be expensive at their introduction but most observers feel prices will come down as the economies afforded by mass production make themselves felt. Likewise with DAT tape. Currently, Matsushita, owners of the Panasonic and Technics brands in the U.S. introduced a DAT tape in Japan that was 120 minutes in length and $13 in price. A 90-minute length lists for $11, a 60-minute length for $9, and a 45-minute length for $8.

Another recordist's medium—again, due to the lack of pre-recorded titles—is also appearing in video, the scene of formats wars between VHS, Beta, and 8mm. The latest salvo in this format war has been fired by JVC, inventor of the VHS format. JVC has developed a "Super VHS" format which is not entirely compatible with existing VHS—old VHS tapes can be played on Super VHS machines but Super VHS tapes cannot be played on old VHS machines.

The improved picture quality offered by SVHS—early claims suggest the format has the best resolution yet—is not cheap. Most tape makers are sure to offer SVHS but the price is likely to be about $2 higher than even the most expensive "pro-type" videocassette available today. TDK, one of the first to announce SVHS availability, is listing for a 120-minute 2- and 6-hour cassette at about $19.50 on the Japanese market. By comparison, TDK's highest-priced VHS cassette lists for $17.50.

The high price of both Super VHS and DAT tape practically guarantees that the more standard audio and video tapes of today will be in general use for some time to come. While these tapes may appear more "common" when compared to their premium counterparts, the amount of technology and research devoted to these products is impressive.

This point is exemplified by a tape like TDK's HD-X Pro product. This tape features a seven-layer construction designed to enhance the tape's reliability. The first layer of tape construction is the magnetic material that actually records the signal and a binder system that actually works as a lubricant for smooth transport. Beneath the first layer is the "high adhesion" layer, a special adhesive that adheres the magnetic layer to the base film. Layers three, four, and five work together sandwich-style and consist of a black carbon layer placed between two layers of base film for greater strength and smoothness. The last two layers include another layer of "high adhesion" and a specially-produced

Tapes *from page 41*

back coating to aid tape transportability.

These seven layers make HD-Pro an especially rugged tape suitable for repeated use even in an outdoor environment through the use of a camcorder. Companies like Maxell, Fuji, Memorex, BASF, and some others make tapes with strong characteristics as well. JVC, for example, has engineered a tape designed to be especially suited for the most common video application—time-shifting. Packaged in a clean, white box featuring bold blue and green bands, JVC's "Premium Standard" tape grade uses added adhesive layers to increase durability. This technique allows the tape to be used over and over again without loss of quality, says the company.

Which videotape you use depends largely on the type of programming you wish to record. For simplicity's sake, its easiest to divide videotape into four categories. One type is "hifi" tapes which are used to make high fidelity stereo recordings on video cassette recorders that feature hifi stereo capability. With hifi tapes, particular attention has been paid to audio specifications to insure the best sound as well as video results.

Of the remaining three types, they are best divided by intended use. Keep in mind that tape quality is largely a function of smoothness and amount of magnetic material on the tape and that generally more expensive tape fulfills these two criteria the best. For some uses, however, you may not require absolute perfection.

"Standard" videocassettes are generally the lowest priced videocassettes in any company's product line. Standard videocassettes are perfectly adequate for everyday video needs like time-shifting. They may not, however, stand up well to critical analysis of picture quality and these grades are most prone to "dropout" or loss of video signal. Dropout is most likely to occur after repeated use of the tape and in extended play modes in which the tape is being asked to record more slowly and with less magnetic material.

If you intend to make a video recording that is destined to become a permanent part of your library, then you may be better off opting for a "high grade" tape. Characterized by a lower drop-out rate than standard grade tapes, high grade tape generally lasts longer in the sense that you'll be able to play the tape back more times than standard before deterioration becomes appearant. The picture quality of high grade tapes in the EP and LP modes is also better as well.

Most videotape manufacturers also offer a "pro" grade like TDK's HD-X Pro tape. This type of tape is for the most demanding videophile looking for top broadcast quality performance. While prices vary, "pro" grades are generally the most expensive.

While these four types of videotape are primarily for use at home, the popularity of camcorders has spawned two small competing formats, VHS-C and 8mm. VHS-C is a diminutive version of the standard VHS cassette. It measures 2½ by 3¾ inches in size, considerably smaller than its full-size cousin. The small size of the VHS-C obviously increases the portablity of VHS camcorders. Its small size, however, does have its drawbacks—only 20 minutes (60 minutes at extended play) of recording time is available.

By contrast, 8mm tape is thinner and not as wide, thereby affording the user a lot longer playing time. The tape is available in a variety of lengths, coming in 15, 30, 60 and 90 minute packages. Which of the two formats you use depends largely on the degree of compatibility you want with your existing system and whether or not you judge the picture quality of one format superior to the other. Remember: there are no real standards against which to judge picture quality so let your eyes be the final arbiter.

Audio tape, the other workhorse of home entertainment systems, is subject to stricter guidelines formulated by an

international committee some years ago and to which all reputable manufacturers adhere. This International Electro-technical Committee (IEC) recognized four categories of audio tape:

Type I tapes which require a playback equalization response of 120 microsounds and a normal bias;

Type II tapes which require a playback equalization response of 70 microseconds and a high recording bias;

Type III tapes requiring a 70 microsecond playback equilization and a normal bias;

Type IV "metal" tape requiring 70 microsecond playback equilization and a "metal" or high recording bias.

"Bias" is an inaudible signal used to correct the discrepancy between the magnetic pattern recorded on the tape and the magnetic field generated by the recording head of the cassette deck. Proper setting of the bias switches on your cassette deck will make your recording more accurate.

"Equalization" is a technique used to compensate for the fact that no cassette deck reproduces signals with a flat frequency response. Every good cassette deck should have equalization settings corresponding to the four tape types. By matching the equalization settings to the type of tape being used, you'll help insure flat frequency response, or, in other words, an accurate recording.

Type I tape is probably the workhorse of audio tape, being used for the recording of conferences, on the one hand, and music on the other. Some companies actually have two grades. Sunkyong, a Korean maker, offers its SKC-GX normal bias tape for general recording while its SKC-AX normal bias tape is for demanding musical recordings.

Type II is characterized by extended "headroom"—meaning that music with greater dynamic range can be safely recorded without distortion at the "high end" or higher frequencies of the audio spectrum.

Type II is also due to have a video application in the near future. Fisher-Price plans to introduce a camcorder this fall aimed at the children's market. Designed to sell for $150, the Fisher-Price camcorder uses a 90-minute Type II cassette to record 11 minutes of black & white video. Undoubtedly, there will be a number of full-grown "children" ready to follow in the footsteps of yesteryear's black & white masters.

Type III tape uses an extra magnetic layer of chromium dioxide to improve high end performance while retaining the bass response associated with normal bias tape. This tape, mainly produced by BASF and Sony, is aimed at the classical music listener wishing to record the quick leaps and plunges of treble and bass experienced in the genre.

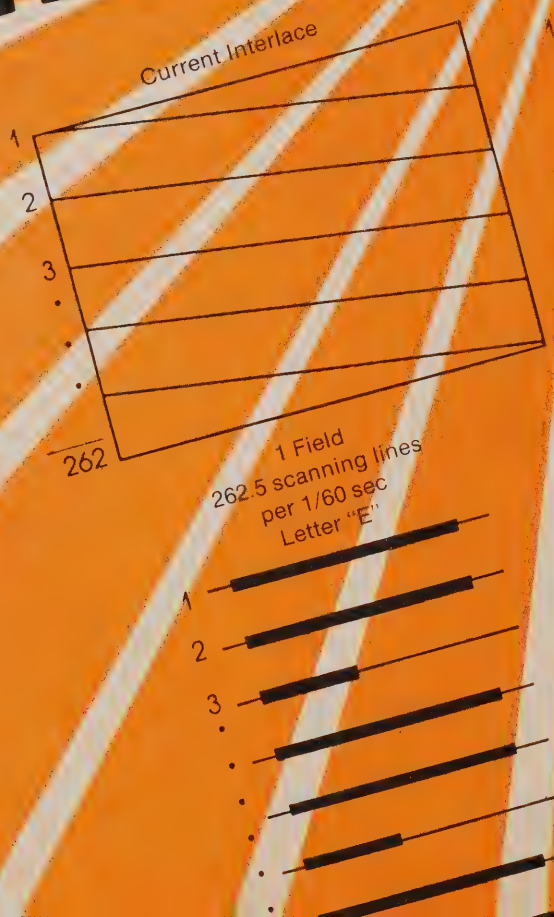
Metal tape, type IV, is used to describe tape that has a powder coating of iron, cobalt, nickel or other metal. The addition of this "metal" layer improves the tape's ability to retain the audio signal. Metal tape generally offers the truest reproduction of an audio signal.

All four types of audio tape are available in 60 and 90 minute lengths. Playback lengths of 46 and 120 minutes are also available but not from every manufacturer. Be warned as well that some cassette decks, most notably car stereo units, may have trouble playing 120 minute length tape because of the amount of tape in the cassette shell.

Audio and video tape is a commodity item marketed by numerous companies catering to the home entertainment market. Tape can be bought in almost every type of store, whether it be an electronics shop or a drugstore. New companies enter the market all the time. General Electric, for example, only entered the videotape market this year. Fortunately, despite the number of companies in the business, specifications are pretty comparable through each grade, with only off-brand, no-name tape offering any serious doubts regarding quality. Feel free, then, to experiment with various types of tape to determine which best suits your eyes and ears.

HIGH DEFINIT

Digital Technology Comparison of Scanning System



TION TV

There Is A Way To Come Close To It Today Through Advanced Digital Technology

When TVs were first introduced in this country a critical decision had to be made - how high a resolution (clarity) should they have? Resolution was determined largely by the number of scanning lines. (A TV picture tube doesn't broadcast a total image - rather it breaks the image up into horizontal lines which are then scanned across the screen one at a time. The more lines, the greater the clarity. The fewer horizontal lines, the less clear the picture.)

The first TVs were only four to eight inches across diagonally and the technology was not far advanced. The powers that be decided that 525 horizontal lines was the magical number. The tube would scan 525 lines across the screen to produce the image that we see. That was the first standard and it's still the standard today.

What's wrong with 525 lines? For an 8 inch TV, nothing. You get a sharp, clear picture. But if you get a TV over 20 inches, you actually begin to see the lines. And for big screens over 30 inches, the lines sometimes get in the way of the image. (If you've ever watched a big screen TV, you've surely noticed those horizontal lines that make up the picture. Perhaps you thought they were a defect in the set or the screen - not so, they are the way the image is broadcast.)

With today's technology and bigger screens, much higher resolution is possible. In Japan, for example, HDTV (High Definition TV) means 1125 lines. When you increase the number of lines, they come closer together on the screen. 1125 lines is such a high number that they blend together and can't be seen at all on even the largest screens.

HDTV has been promised for quite some time for the US. But there are serious obstacles in the way. We already have the 525 line standard with upwards of 100 million TVs out there using it. To change the standard would make those TV obsolete - not something any manufacturer or government agency would dare attempt.

On the other hand, it might be possible to break in a new HDTV system parallel to the current low definition system and there are plans afoot for that. (See the story on the future of TV by Bob Cooper Jr. in this issue - Editor.) But until that happens, we are stuck with the existing low definition system. Or are we?

The engineers at Toshiba last year intoduced what they called a "non-interlaced" TV set. It is just now finding it's way to the marketplace and it is getting rave reviews.

Called the "CZ 2697", this 26 inch TV is immediately identifiable as being different from all its cousins. When you place it side by side with almost any other TV, you'll notice the difference. For one thing, the lines aren't there. For another, the picture looks sharper, clearer.

Those are the good points. There are problems. For example, though

the picture looks clearer and sharper, it doesn't necessarily look better. Some viewers say that it tends to have a synthetic quality to it, that it's almost unnatural, unreal.

Of course, many of us find that appealing. Why should a TV set be commonplace, ordinary or even realistic? The very idea of television is surrealistic so why not take it one step further and have a surrealistic TV?

Ultimately, of course, you have to see it and judge for yourself, which I strongly encourage you to do. You may find that the CZ 2697 is the best TV you've ever seen.

But is it HDTV?

Not really. But it is a very clever usage of new technology. The CZ 2697 is one of the first sets to truly pay off on the promise of digital TV.

Digital TV has been around for 3 or 4 years. But thus far most of what we have seen has been gadgetry. For example, in the minds of most viewers digital means PIP (picture in picture). If you ask the average viewer about a digital TV, they immediately tell you that it means you can watch two channels simultaneously on the same screen.

Certainly you can. But that is only one use of digital circuitry albeit the most dramatic use that manufacturers could find. It's sort of like when TVs went from tubes to transistors. It was an enormous technological breakthrough. But you couldn't see a whole lot of difference from the outside. So the manufacturers put little stickers on the sets to clue viewers in to what was happening. Similarly, going to digital circuitry is an enormous leap forward, but it doesn't always show. The one immediate, dramatic way of demonstrating it, however, is PIP.

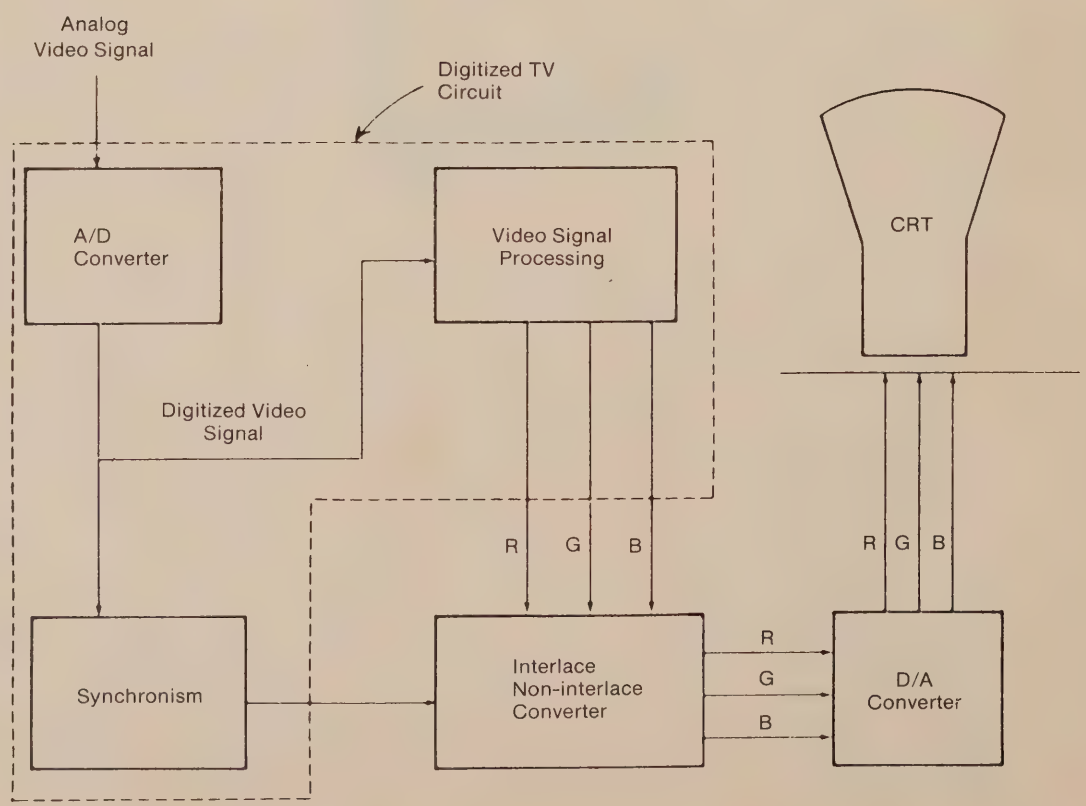
Toshiba, however, is now using digital circuitry in a new and different way and the result is the amazing picture found on the CZ 2697. Here's how it works.

As many videophiles know, a standard TV scans 60 times a second. That means that 60 times every second it creates the horizontal lines which we see as the image.

What many of us don't realize, however, is that it doesn't create all 525 lines 60 times a second. Rather, it divides the lines up into odd and even. The first time it scans, it hits all the odd horizontal lines (1, 3, 5, 7, etc.). The next time it scans it hits all the even horizontal lines (2, 4, 6, 8, etc.). During a second it hits the odd lines 30 times and the even lines 30 times, thus we get 60 scans a second. But the full field (both odd and even together) are scanned only every 30 seconds.

As a result, our eye tends to see those horizontal lines even more. If only TVs scanned the full field every 60 seconds (both odd and even) our

System Block Diagram of Digital Non-Interlaced TV



pictures would be far clearer.

Alas, that's a function of broadcast transmission and can't be easily changed at the set. But what can be done is to "fill in" the missing horizontal lines using digital circuitry.

Thus, on the Toshiba CZ 2697, when the odd lines are broadcast, the TV set automatically "fills in" the even lines and when the even lines are broadcast, the TV automatically "fills in" the odd lines.

Thus the set is scanning twice as fast as the image is being broadcast and the digital circuitry is automatically filling in what the broadcast image leaves out.

Double scanning produces a full 525 lines of image each scan instead of the 262 lines that are standard. The result is that the image looks sharper and clearer. In a way, the resolution has actually been doubled.

It's important to remember, however, that the "filled in" lines were never really broadcast. The set created them from the broadcast lines on either side. (When odd lines are broadcast, the set "blends" them to create even lines. When even lines are broadcast, the set "blends" them to create odd lines.)

As a result the image is not quite the same as what is broadcast. Of course, the human eye is not fast enough nor sufficiently accurate to pick up the difference, entirely. What happens is that when we watch the screen, we don't actually see what's happening, but we do tend to notice the image has a different, unusual, perhaps surrealistic quality to it.

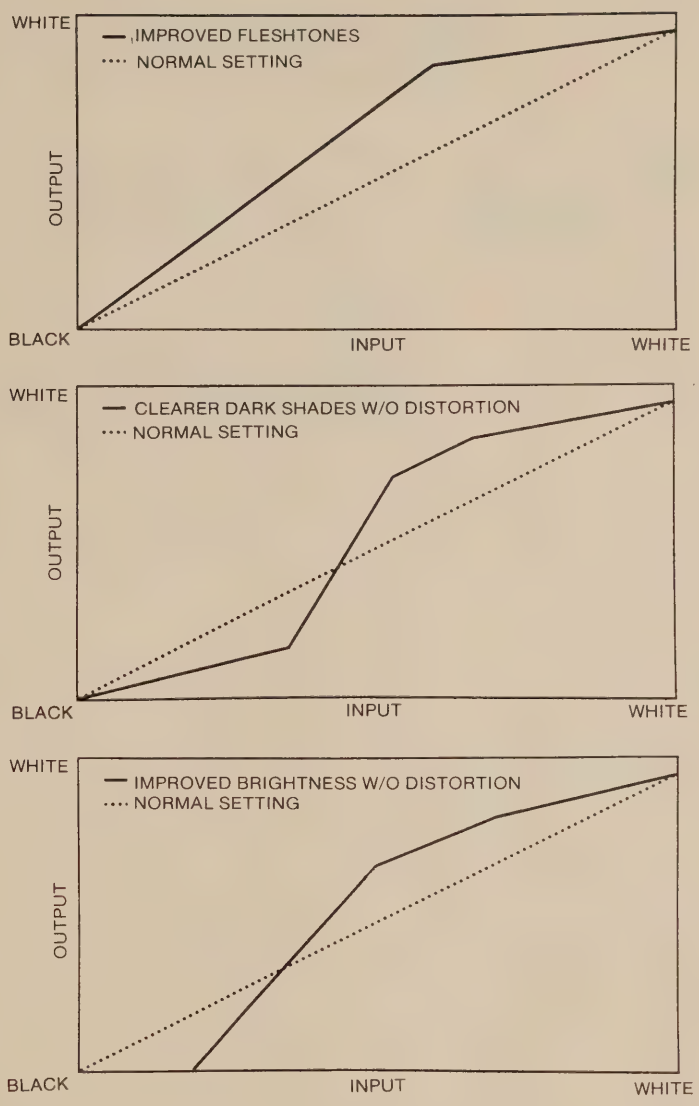
Thus Toshiba while increasing resolution, has also given us a new element in television.

Will this non-interlaced technology soon be incorporated in other sets?

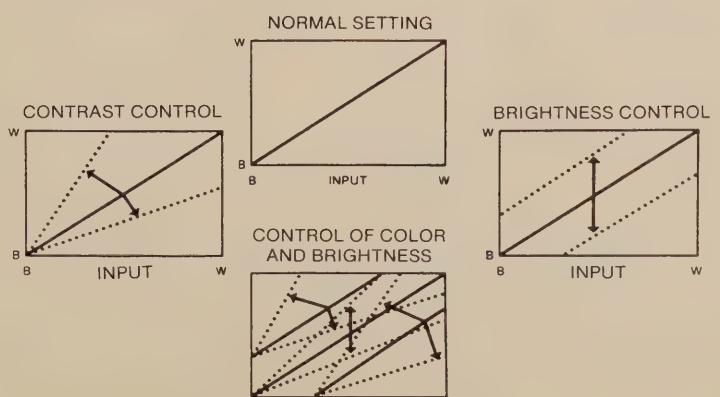
Perhaps. But it's important to keep it in perspective. Non-interlaced TV is a way to get higher resolution without paying the price of changing the standards. It gives us the taste without the substance.

Eventually, however, particularly as big screens become an increasing part of the market (estimates are that close to half a million will be sold this year) we are going to have to bite the bullet and adopt a new standard that fits in with our new technology.

Digital Picture Processing



Conventional Contrast and Brightness Control



Breaking The Scrambling Barrier

Low Cost Program Packages Just For The Satellite Viewer

by ROBERT OAKES

"The trouble with TV today is that it just isn't free anymore!" I've heard that comment more times than I'd care to recall, mostly from people who bought a home satellite system a few years ago and now find that many of their favorite channels are scrambled. I sympathize with their views - it's hard having to start paying for something that before you were receiving for nothing. But the real truth is that TV never was meant to be, never will be free. The only real question is, is the charge for it reasonable?

As we'll see, the price of TV services for home satellite viewers has dropped dramatically, dropped to the point where they are indeed a real option at a low cost. But before getting into specifics, let's take up the matter of paying at all. Why should a person who buys a home satellite system, have to then pay for the programming?

The answer is both simple and complex. It's simple in that if someone doesn't pay, then the programmers simply won't broadcast. They aren't a charitable organization; they don't offer their services for the love of doing it. They are businesses and as such are interested in making a profit (or at least breaking even). If someone doesn't pay for the programming, the simple answer is that there won't be any programming.

The complex answer has to do with who pays. For commercial TV, everyone who watches pays. Whether you watch a show from NBC, CBS, or ABC or a show from a locally originated over-the-air station, the payment comes from advertising revenues. Manufacturers of products from soap to dog food pay the broadcasters to air their commercials.

The temptation, however, is to say that the viewer doesn't pay. After all, he never takes any money out of his pocket.

Not so. Every seven to 15 minutes we pay by having to watch several minutes of commercials. Even more so, everytime we buy one of the products advertised we pay even more directly. There have even been studies done to determine exactly how much the average viewer pays for commercial TV. I've seen figures that range anywhere from a few dollars to several hundred dollars a month! The simple truth is that if we, as viewers, didn't pay, the manufacturers of products wouldn't advertise and there wouldn't be any commercial TV. The fact that commercial TV exists, proves that we are paying.

Of course, then there's cable. With cable we often have to pay twice for some programming. First there's the cable charge. Then, if we watch commercial TV we pay in the form of advertising - double payment.

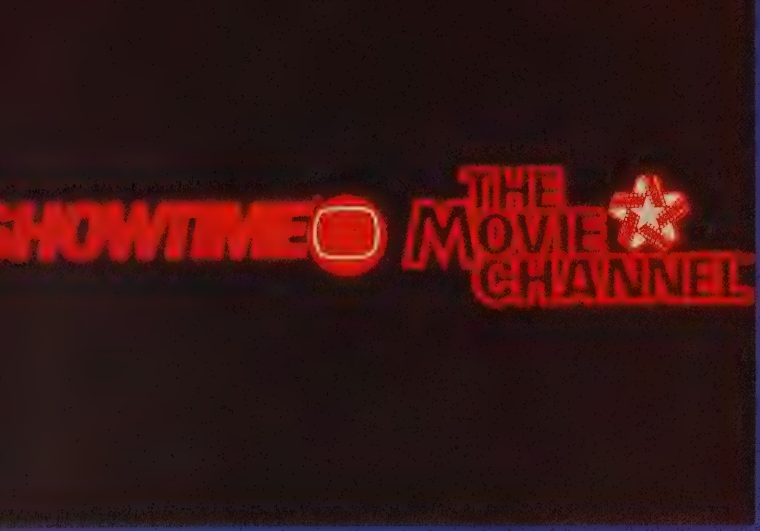
On the other hand there are the premium channels such as Showtime, The Movie Channel, HBO and so forth. They don't have advertising, but those connected to cable pay for them as a monthly premium fee.

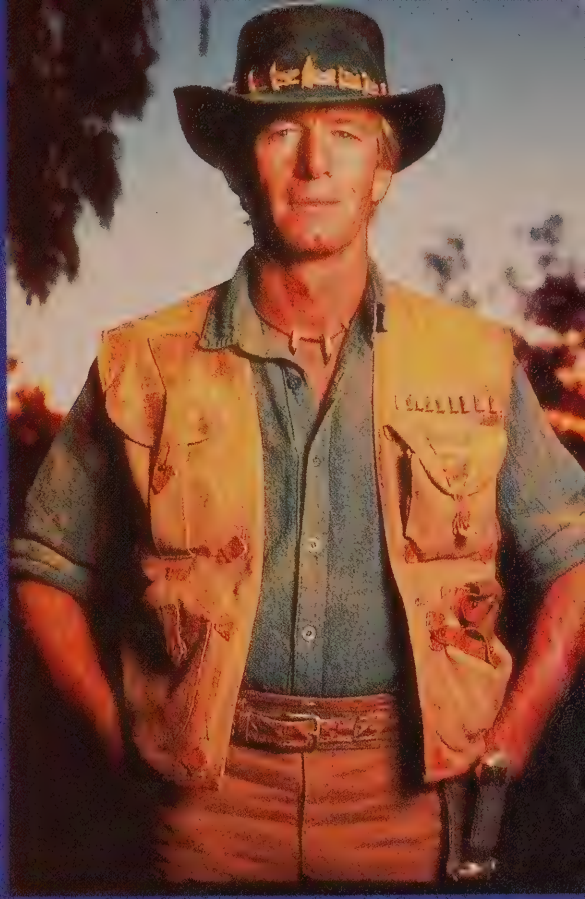
Thus far we are talking about a state of affairs that's been in place for decades. We may complain about the costs, but rarely does anyone argue that paying is what brings the picture to the TV set.

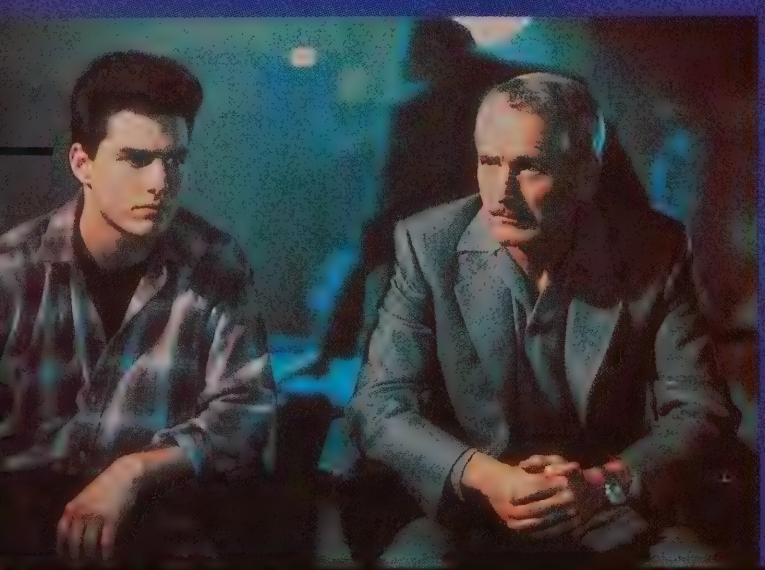
On the other hand, there's satellite

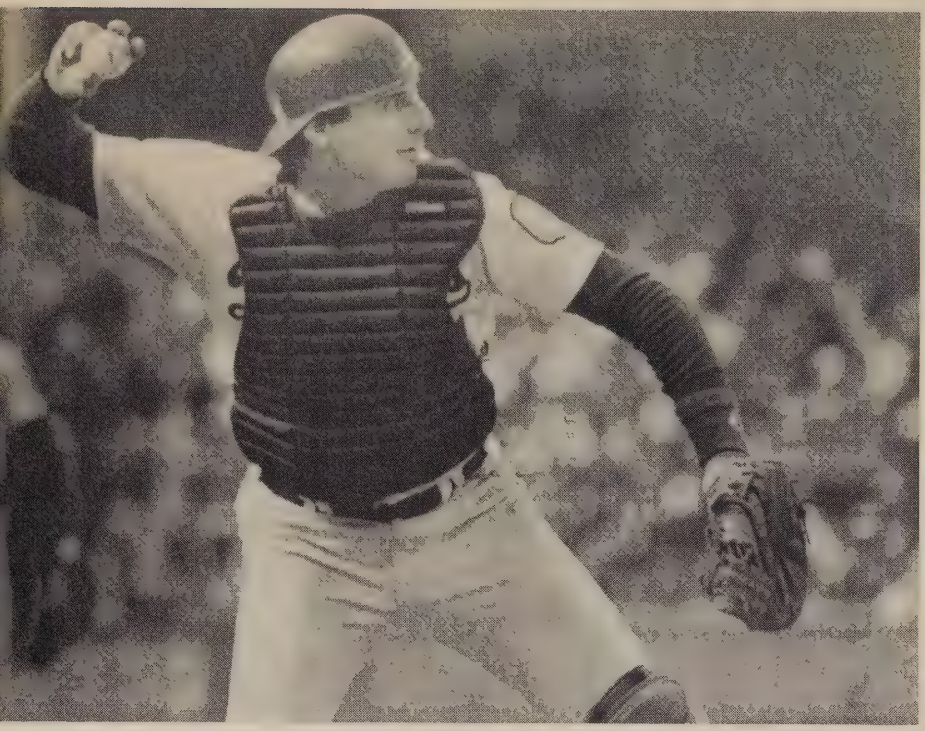
Continued on page 50

Leading The Pack - *Showtime/ The Movie Channel has broken through the impasse over scrambling with its new package. Featured (in addition to its own Showtime/ TMC) are 12 other premium channels including sports, networks, music, learning and children's shows - all for as little as $20 a month. With descramblers now built into many receivers (or available separately for under $400), the home viewer can again see clear skies.*


SHOWTIME
THE MOVIE CHANNEL







Virtually every televised game in America is now available from a variety of TV packages.

SHOWTIME® THE MOVIE CHANNEL™

SERVICE CHOICE

	Monthly	Annual Prepaid
Showtime or the Movie Channel or Satellite Package	$10.95	$120.00 ($10/mo. effective)
Showtime and the Movie Channel	$16.95	$186.00 ($15.50/mo. effective)
Showtime & Satellite Package or the Movie Channel & Satellite Package	$17.95	$192.00 ($16.00/mo. effective)
Showtime, The Movie Channel and Satellite Package	$22.95	$240.00 ($20.00/mo. effective)

In a bold and exciting move, Showtime/The Movie Channel has broken wide open the barriers to home satellite reception of premium channels. Announcing a new package, it is now possible to receive Showtime/TMC *plus* 12 other services for as little as $20 a month. (If you want just Showtime or just the Movie Channel plus the other services, the cost is as little as $16 a month.)

To understand the significance of this offering by Showtime/TMC one must only remember that 6 months ago it appeared that the cost of EACH of the various services might be billed separately and a home satellite viewer might end up paying upwards of $150 a month or more for all of them. To now find that they are available for $20 or less is probably the most exciting news to come down the pike in a long time. (And Showtime/TMC officials indicate that the price could fall in the future!)

Continued on page 51

Barrier *from page 49*

TV. Here the viewer has invested a thousand dollars or more for equipment similar in nature to that which cable operators have. The home satellite viewer, in effect, bypasses a cable system. Why, therefore argue some viewers, should they have to pay for programming?

The truth of the matter is that if you're over 11 years old, you should realize that there's no such thing in life as a free ride, at least not for very long. If you want something, you have to pay for it . . . one way or another. Even cable operators pay for programming; they just pass the cost along to their subscribers.

Home satellite TV viewers are no exception.

Yes, for a time the premium programming was free. But what did "free" really mean?

It meant that the home viewer was picking up the signal aimed at the cable operator. It may have seemed free, yet somebody was paying for that signal (else it wouldn't be broadcast). That somebody was the cable operator.

If this had been allowed to continue, then eventually there would have been no cable operators and everyone would have had home satellite systems. (Economics tells us that no one is going to pay for something that is offered for free.) Those who think this might have been a desirable result might reconsider. For there also would have been NO programming. It costs money to put that programming up on the birds and nobody is going to do it for free.

Eventually, sooner or later, the home satellite viewers had to pay. It turned out to be sooner.

Last year M/A-COM released the VideoCipher descrambler and the major premium channels scrambled their programming. From that time on, only those who paid would get the programming. The others would not.

Of course, that didn't mean that the skies went dark. There are still over a hundred transponders out there broadcasting unscrambled programs even today. But rest assured someone is paying for those transmissions. And ultimately, one way or another, that

somebody is the viewer. But to get the premium channels, the Showtime, The Movie Channel, HBO and others, today you have to pay.

Having said that, the real question, as noted earlier, is how much do we have to pay? Is the cost reasonable? Or is it outrageous?

When scrambling first started, HBO offered its service combined with Cinnemax for something around $24 a month. (The single premium channel was in the $15 a month range, but prices changed rapidly so it really depends on when your speaking.)

Those who had home satellite systems and others who were planning to buy them were aghast. If each channel from ESPN to CNN to HBO charged $15 per month, to have just 10 premium channels would cost $150 a month. To have 20 would be $300!

The threat of this (Plus the fact that initially almost no descramblers were available) brought the home satellite industry to an instant halt. Nobody with a grain sense in their head was going to spend thousands of dollars for a high tech system and then pay several hundred more a month in fees to get programming. It made no sense.

Of course, the programmers realized this. Unlike many who accused them of ill intentions, the programmers viewed the fledgling home satellite TV field as their growth industry. That's where they were going to get their new business. Many of them were just as appalled at what happened to the field last year as were those who were more directly involved. It was as if scrambling had killed the goose that lays the golden eggs in its basinet.

Help, however, was on the way in the form of "packages."

Packages offer a combination of programming for a single monthly fee. In theory the cost of the package could be much cheaper than the cost of each individual channel.

When this idea was brought forth last year in some early, tentative tries at packaging, there was a lot of scoffing. Few believed that there was any real hope that way. "The programmers are all greedy and they never will cut their prices," was a common attitude.

It was reinforced by the fact that the

Continued on page 52

Showtime/continued

The services offered in the package *in addition to* Showtime/TMC are:

The Learning Channel
CBN Cable Network
The Discovery Channel
CNN
Headline News
Lifetime
The Nashville Network
USA Network
ESPN
MTV: Music Television
Nickelodeon
VH-1/Video Hits One

Steve Schulte, Executive Vice President/General Manager of Viacom Satellite Networks indicated that he doesn't expect an initial burst of subscribers mainly because many of the services in the package aren't yet scrambled.

However, they are all planning to scramble shortly and when they do, the package will make perfect sense.

Schulte also emphasized that the pricing indicated for the package is *for scrambled channels*. The price WILL NOT go up when the currently unscrambled channels, scramble. If anything, as more subscribers come on board, the price may go down. The current cost is for the services as if they were already scrambled.

It's important to note that the lowest price for the services comes from paying on an annual basis. As the enclosed chart indicates, the annual price for Showtime/TMC and the package is $240 which works out to $20 a month. If paid monthly, however, the price would be $22.95.

To receive Showtime/TMC, of course, requires that you have a satellite system and a VideoCipher descrambler. To sign up the toll free number is 1-800-422-9000.

NETLINK USA

This is a relatively new packager who started suppling services at the first of the year. NETLINK USA offers six stations with a wide variety of programming. These are:

KUSA (ABC) - Offers hit series such as "Moonlighting," "20/20" and other ABC offerings.

KCNC (NBC) - Offers the full fare of NBC programming including "The Cosby Show," "Cheers" and "The Johnny Carson Show."

KMGH (CBS) - "60 Minutes," "Newhart" as well as the CBS news programs.

KRMA (PBS) - All of the critically-acclaimed public broadcasting programs are offered.

KDVR (Channel 31) - This is Fox broadcasting including shows such as "Late Night With Joan Rivers" as well as films.

KSPN - THE ROCKY MOUNTAIN CHANNEL - Lifestyle programming including winter and summer sports.

To sign up for the package call 1-800-642-8080. All six channels are available for $6.65 a month.

HBO cinemax

The premium channel giant indicates that it is moving toward offering a complete package sometime in the future. But currently it is only offering the combination of HBO and CINEMAX.

Continued on page 52

"Every scrambled channel is, or will soon

HBO Cinemax/continued

For home satellite viewers who wish to pay annually, however, either HBO or CINEMAX can be obtained at a discount. The discount is simply that the subscriber will pay for nine months of service and receive three months free. This brings the price for either channel into the $7 to $8 range.

STARION
ENTERTAINMENT

Last year, Amway Corporation bought up the old SelecTV and is now marketing it under a newly formed corporation, Starion Entertainment.

Starion began operating last November and offers 24 hours of films, essentially the original SelecTV programming. Although the product is marketed through Amway, you do not have to be an Amway distributor or purchase Amway's products to subscribe.

All that's needed to get SelecTV is to call a toll free number (1-800-DECODE-1) and sign up. (Of course, you also need a VideoCipher descrambler.) The price of the service is quite reasonable at $7.95 per month *on an annual basis.*

Starion is based near Amway's headquarters in Ada, Michigan. It has a complete voice center and fully computerized subscription management and back office functions. It has the ability to activate VideoCipher decoders instantly.

Although at present Starion only offers SelecTV, in the future plans call for additional programming as more services scramble. According to a representative, Starion is currently having discussions and is negotiating with different programmers.

In addition to programming through Starion, Amway is also actively selling its own home satellite system (see article on new items for satellite owners - editor). The Starion programming is seen as a way for the 750,000 Amway distributors in the U.S. to sell a complete package of hardware and software. Of course, Starion will also be sold by satellite TV hardware dealers.

Starion, with its SelecTV programming offers dish owners an alternative choice—another way to get reasonably priced premium viewing.

PRIME TIME 24

PrimeTime 24 is a specialized answer for home dish viewers who wish to receive network TV. It offers a three-channel package of CBS, NBS and ABC originating from affiliates in Chicago, Atlanta and New York. (The three stations are carried on RCA Americom's Satcom II-R satellite -F2- on channels 3, 11 and 23.) PrimeTime 24 sells for $49.95 annually and is available to subscribers through the toll-free number: 1-(800)-248-2844.

The whole idea behind PrimeTime 24 was that as networks began scrambling their feeds, the home satellite viewer would be left in the dark with regard to their programming. In addition, many home view-

Continued on page 53

Barrier *from page 50*

programmers, particularly the premium channels, didn't initially offer any packages themselves. Why, if they were so interested in the home satellite field were they dragging their feet?

As it turns out, the reasons were primarily logistic and legal. It takes a lot of effort and time to sign up a variety of services under a contract where everyone is satisfied, everyone gets paid and the viewer only has to pay a single bill.

It really took until this year for true packages to come into their own. In terms of programmers the real ground breaker was Showtime/The Movie Channel.

Moving forward in the face of criticism from home satellite viewers and resistence in its own industry, last April Showtime/TMC came out with a courageous package that almost on its own virtually revitalized the whole field.

The package offers both Showtime and TMC plus 12 additional premium services including those most desired for a total combined (at the lowest rate) of $20 a month. Showtime/TMC's offer meant that skies were suddenly open again. For what is a nominal and reasonable fee, 14 of the top channels are available to home satellite viewers. What's more, representatives of Showtime/TMC indicate that as more people sign up for the service, its price can be expected to DROP!

At about the same time two manufacturers virtually blew the lid off the field from the other end with "discount satellite programming." Houston Tracker and Ecosphere offered those who bought their units a free year's subscription to 20 scrambled and soon-to-be-scrambled channels.

And this wasn't all. Other packages were put forth. Primetime 24 offered to unscramble all three networks for a low annual fee. The superstations lined up to offer a sports package. And

other programmers began jumping on board the bandwagon competing to offer their own packages.

As a result, the whole world of satellite TV is opening up once again. Retailers report amazing strong sales. Interest from around the country is swelling.

The news that unscrambled TV is available at low cost seems to have made the big difference. Those who want the ultimate home entertainment system are plunging in and adding satellite systems (there is no other way to get top audio and video reception).

BLACK BOXES

What would a story on scrambling and its effects be without a few comments on black boxes?

For those who have been living in a submarine and out of contact, as soon as the major premium channels scrambled their signals over a year ago, many hackers began trying to produce home grown descramblers or "black boxes". There was (and still is) some sentiment in favor of this by home satellite viewers who see it as a way to continue receiving free signals. In fact, some have described the whole scrambling issue as the "Black Box Wars." Unfortunately these "wars" have taken a number of bizarre twists.

On the one hand, many are ready to applaud the hackers trying to break the code. They are seen as the Davids challenging the Goliaths of the communication industry. Many view them as the embodiment of good old American enterprise. It's the big company saying. "It can't be done," and the tinkerer saying, "Oh yeah? Just watch me!"

On another level it's much more serious. At stake is the copyright protection afforded to producers of entertainment and the right of programmers to charge for their product. If hackers could crack the code and unscramble the signal, then potentially the artists who make the movies and

Continued on page 54

Prime Time/continued

ers who had never before received network TV because of their rural location would now be able to tune in.

"PrimeTime 24 customers can enjoy crystal-clear reception of all three networks, many for the first time," notes President Kazie Metzger. "About half of today's 1.8 million dish owners live in primarily rural locations that have poor network reception...or none at all. PrimeTime 24 viewers also enjoy the convenience of the three networks on a single satellite, and the programming diversity of 24 hour channels—in stereo from three different major American cities."

One potential problem with PrimeTime TV is that the networks themselves may not like having the programming rebroadcast. As a result, PrimeTime TV was involved in litigation over their programming as we went to press.

Discount Satellite Programming

Here's an innovative new package that is available to those who purchase satellite hardware equipment.

Houston Tracker Systems, Echosphere Corporation (both manufacturers of IRDs) have joined with Turner Broadcasting System to offer over 20 different channels of programming free for one year to those who buy software.

Turner is operating the package under the name of Discount Satellite Programming. Here's how it works:

For those who buy either a Houston Tracker or an Echosphere Integrated Receiver/Descrambler (IRD), a year's free subscription to the following programming is included:

Arts & Entertainment (A&E)
Black Entertainment TV (BET)
CBN Cable Network (CMN)
Country Music TV (CMT)
Cable News Network (CNN)
The Discovery Channel (TDC)
Entertainment and Sports Network (ESPN)
Financial News Network (FNN)
Headline News (HN)
Hit Video USA (HVU)
The Nashville Network (TNN)
Netlink USA (KCNC, KDVR, KMGH, KRMA, KSPN, KUSA)
PrimeTime 24 (WABC, WBBM, WXIA)
SuperStar Connection (KTVT, WGN, WPIX)
SuperStation WTBS (WTBS)
Tempo Television (TEMPO)
USA Network (USA)
The Weather Channel (TWC)
WOR TV

Houston Tracker Systems IRDs include the top-of-the-line Tracker System VIII and the mid-line System VII as well as additional models soon to be introduced. Besides offering on-screen graphics, digital

Continued on page 54

Discount Satellite/continued

stereo, Video Noise Reduction filters and parental lockout, they also offer UHF wireless remote (not infrared) with a 200 foot range. (The advantage of UHF over infrared is that with UHF you don't have to point the remote at the receiver—you don't even have to be in the same room—for it to operate.)

Tom Ortolf, President of Houston Tracker Systems, noted, "We are very pleased to join with this group of programmers in introducing this exciting new package to consumers. This truly represents a turning point in the satellite industry; it is concrete proof that today's top programmers are sincerely committed to the needs of the dish owner."

Echosphere also offers an IRD block downconversion receiver integrated with an antenna positioner. The line includes a state-of-the-art SRD-8000, the simplified SRD-7000, and the budget minded SRD-4000.

The offer applied to all Houston Tracker and Echostar IRD units put into distribution by June 30, 1987. For further information, contact your local dealer.

SUPERSTAR CONNECTION

United Video, an uplinker of satellite transmissions, is offering a package it calls THE SUPERSTAR CONNECTION.

The package consists of three stations, WGN, WPIX and KTVT. Between the three the viewer has an opportunity to see movies, sports and TV series.

Continued on page 55

Barrier

the programmers who show them might not be able to collect. Carrying the argument to its logical consequence, no pay - no product. Black boxes had the potential of destroying our whole TV entertainment system.

Of course, it all would have been moot if the VideoCipher scrambling system had indeed lived up to all the claims its creators made - namely, that its code couldn't be broken. Very quickly, however, resolute and clever hackers found a back door way of breaking into the VCII and soon were able to gain access to virtually all encryupted programming. The day of the "black box pirate" was at hand.

This occurred last autumn and quickly threw the whole field into confusion. A great many home satellite system owners who had purchased their systems in the days before scrambling felt they were entitled to continue receiving programming free. As noted, they strongly resented paying. Some of these jumped at the chance of getting a black box decoder. This threatened the sale of legitimate VideoCiphers.

To add to the confusion, unscrupu-

lous operators moved in and began selling worthless black boxes that didn't decode or that did so only for a short while before they failed. They cheated their buyers twice - first into thinking that they were offering something for nothing and second by selling a defective product.

This is not to say that real black boxes were not available. These took the form of some manufacturers who began selling clone chips that could be inserted into the VideoCiphers to render them unable to stop descrambling. The chips, in effect, locked them open.

For a time at the end of last year chaos reigned. Home satellite system owners were again being labeled pirates. Threats were heard from the government about doing something to stop it.

To add to the pressure, SPACE, the home satellite industry association merged into a new organization called SBCA (the Satellite Broadcasting and Communications Association) which included some of the country's largest corporations in spacecraft manufacture, programming, satellite equipment manufacturing, distributing and retailing including COMSAT, RCA, Turner Broadcasting and others to name just a few. The big boys had arrived.

It all came down to General Instruments, the company which had bought the rights to manufacture the VideoCipher from its originator, M/A-COM. Their product had promised it was tamper free. That claim, as hackers had demonstrated, was not entirely true. Now, GI had to do something or risk losing the market for its product, not to mention risk having the whole field come unglued.

So GI acted. On the one hand it offered a limited amnesty to users who had had their VideoCiphers illegally converted to black boxes. On the other, it introduced a $5 million lawsuit against a number of individuals who, it said, were helping to promote the illegal sale of chips to defeat the VideoCipher. GI apparently was arguing that it was patent infringement and perhaps copyright infringement. GI's goal appeared to be to win in court the black box war it had lost in technology.

Superstar Connection/continued

WGN features recent movie hits as well as a number of TV series classics such as "The Waltons" and "The Bob Newhart Show." It also features 150 televised games of the Chicago Cubs as well as Big Ten, DePaul and Notre Dame basketball action.

WPIX in New York tracks sports year 'round with professional and college baseball, basketball and football. The Yankees are back with over 100 televised games. In addition, movie classics are also featured.

KTVT of Dallas/Ft. Worth shows over 50 Texas Rangers baseball games and live coverage of key Southwest Conference basketball and football match-ups. In addition, TV classics series such as "The Dukes of Hazzard," "Diff'rent Strokes," "The Fall Guy" and others are also featured.

The price for the SUPERSTATION CONNECTION is $36 a year with discounts for multiple year subscriptions. Those interested can call 1-800-238-9749.

The Packagers

Showtime/The Movie Channel
Movies & Entertainment 1-800-422-9000
As low as $10 for one premium channel (See price chart with text)
As low as $20 per month for two premium channels and a package of 12 services (see story).

AMWAY-STARION
$7.95 a month — SelecTV Movies — 1-800-DECODE-1

PRIMETIME 24
$49.95 annually — WXIA (Atlanta) NBC, WABC (New York) ABC, WBBM (Chicago) CBS — 1-800-248-2844

DISCOUNT SATELLITE PROGRAMMING
Free with the purchase of either a Houston-Tracker or Echosphere IRD. (Time limits prevail)
Over 20 different programming services (see story).

SUPERSTAR CONNECTION
$36 annually — WGN Sports, movies, WPIX and other, KTVT entertainment — 1-800-238-9749

NETLINK USA
$6.65 per month — KUSA (ABC), KCNC (NBC), KGMH (CBS), KRMA (PBS), KDBR (Channel 31), KSPN (Rocky Mountain) — Network shows, public broadcasting, sports, movies. 1-800-642-8080

HBO/CINEMAX
$7-$8 monthly on an annual basis - otherwise $12.95 each month.
Movies & Entertainment 1-800-HBO-DISH

CNN and HEADLINE NEWS
$25 annually (Includes WTBS for first year)
News 1-404-827-2187

Evaluating The MONITOR/RECEIVERS

What You Should Know Before You Buy Your Next TV

by MARC WIELAGE & ROD WOODCOCK

It seems like *everybody* is trying to sell you a TV set these days. One imported brand says their TV's are "expensive electronics...without the expense." Another promises their sets are "just slightly ahead of their time." And another claims their products are "expensive...but darn well worth it." So, the big question is: who do you believe?

Advertising slogans aside, buying a TV set right now can be almost as formidable as buying a used car. Everybody's got "the best deal." All the sets have features galore. And there seem to be twice as many TVs available this year as there were last year. Even worse, TV sets aren't even *called* TV sets any more. In most high-tech electronic emporiums, the lowly "boob tube" is now known as a fancy-schmancy "monitor/receiver." With some cheap sets, the only difference may be an extra audio/video input jack for hooking up a VCR, which adds perhaps $10 to the manufacturing costs. (So much for high tech!)

Even though buying a new TV set today is a little trickier than it was in the "golden days," it doesn't have to be a major headache. As a matter of fact, today's 1987 model TVs offer greater value, better performance and more dependability than ever. Just about every set made today uses less energy and puts out visibly brighter, sharper, and more colorful pictures than comparable sets from as little as five years ago, thanks to technological breakthroughs in tube design and LSI's—those ultra-miniaturized chips that tune in and lock on to the pictures on your electronic window.

If you're a high-tech fan looking for a high-ticket set, your decision boils down to several choices between price, features, and picture quality. Every deluxe set has a different balance between the three, and depending on your specific requirements—and your wallet—it's not too difficult to add up all the different factors and decide which set to take home.

HIGH-TECH FEATURES GALORE

You don't have to be a video connoisseur to appreciate the advances in convenience features now found in many deluxe TV sets. We already mentioned *direct audio/video inputs*, which transform an ordinary TV set into a more versatile *monitor/receiver*. Better monitor/receivers offer not just one, but two or more inputs, for allowing you to choose several video sources to watch—say, an off-air ball game, a VCR, and a camera. Depending on its complexity, this feature can add $100 or so to the retail price of an average TV set. It's worth it if you have a VCR now, or plan to add one in the future, though be advised that you don't *have* to have a video input on your set to connect it to a VCR. However, having one will make hookups a little easier, and will also slightly improve the picture and sound quality of the videotapes you watch.

The latest generation of monitor/receivers go a step further and offer a special dual *YC jack*, which is designed especially for hooking up Super VHS and ED Beta VCR's, which can reproduce up to 500 lines of resolution. This unique circuit allows feeding the color and B&W signals separately into the monitor, which helps eliminate the jaggedy "chroma-crawl" edges of fine details seen on most conventional sets. Few sets have YC jacks yet, but we expect it to be a standard feature on all deluxe 1988 models.

Some "component-styled" monitors offer facilities for dubbing between two VCR's. If the set you're thinking of buying has only one input, don't despair: this feature can be easily retrofitted with accessory switchers and control centers, some costing as little as $50. A few monitor/receivers offer a special *RGB input* designed to let you connect a color computer system. In general, we believe that dedicated computer monitors will outperform most dual-purpose TV/RGB monitors, particularly for word-processing, which requires higher resolution.

Remote control is the most popular and often-requested TV feature, one much appreciated by devoted couch potatoes across the country who like to play "channel roulette." Today's

Continued on page 58

The Video Edge - *New LV56 series sets in color from Sharp (top) offer 110-channels, PLL quartz synthesized electronic tuning, channel flashback and automatic color system. Fisher has built its high resolution color monitor (bottom) into an MTS 4 speaker stereo system that offers both a 31 button remote plus 181 channel compatibility.*

LINYTRON
SHARP

remote controls are almost all of the *infrared* variety, using invisible beams of light to trigger different functions in the TV set a big improvement over the less-reliable ultrasonic or "acoustic" remotes of years past.

A basic remote will let you turn the set on and off, change the channel and adjust the volume; this adds roughly $50-100 to the cost of a basic set. More elaborate remotes let you adjust contrast, color and brightness, select video inputs, or even run optional video recorders, and can add up to $300, depending on their complexity. Don't be overwhelmed by remotes like these, though. Most of them have one switch that allows you to return the screen's settings to normal, should Junior happen to tweek the monitor to look dark, green and ugly.

On-screen Displays are another high-tech feature that's guaranteed to please any dedicated gadget-lover. Magnavox' STAR system is generally credited as being the first to offer this feature, which is now a standard item in any big-ticket TV. Some on-screen displays are handy to have, such as those indicating the time of day and the channel number. Others get downright intrusive, with separate readouts for brightness, contrast, color intensity & hue, volume and balance. And at least one manufacturer, Sony, offers a set on which you can leave memos for your family. While this is clearly more exciting than the old-fashioned "paper" method, it may be a little ahead of its time. Convenience aside, on-screen displays will add anywhere from $100 to $300 to the overall cost of the set.

Deluxe Tuners: Moving up from the basic click-stop tuners found in bargain-basement sets, better models generally have pushbutton *varactor* preset tuners, which let you pre-tune a dozen or so channels to your favorite stations. Even better is the *voltage-synthesized* tuner, which gives you a wider number of available channels, usually shown in an LED readout on the console (or on an on-screen display), but it still must be tuned in when you first program the set. La creme de la creme is *frequency-synthesized* tuning, which automatically locks on to any station in your area, and tunes in all by itself. Since the circuitry for most tuners has been highly miniaturized in the past few years, the cost differences between these types have shrunk considerably, to the point where even some mid-priced sets now routinely feature frequency-synthesized tuners.

Many deluxe sets equipped with frequency-synthesized tuners have extra bells and whistles tied in directly with the tuner: *last channel recall*, which lets you rapidly switch back and forth between two different channels—a must for the sports fan intent on seeing *all* the action from rival weekend games; *parental lockout*, which helps prevent small children from accessing adult programming on certain pay channels; and *sleep timers*, which automatically turn the set off after a given amount of time. Any of these features add only a few dollars to the cost of an average deluxe set.

The biggest, and certainly the most controversial, tuner feature now available are those that claim to be *Cable-ready*, or, more accurately, "cable compatible." No matter what name you give to it, this feature has quickly become one of the great misnomers of all time, confusing consumers and dealers alike. Manufacturers are fond of claiming a particular set can receive "up to 180 CATV channels," never bothering to mention, for example,

Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
Akai	CT-202BA	20"	142 ch.	2	2/2 (3 RF)	19½" x 20¾" x 19"	on-screen display; sleep timer	$1000
	CT-A262BA	26"	142 ch.	2	2/2 (3RF)	28" x 43" x 16¾"	last ch. recall; on-screen display; sleep timer	$1100
Denon	T-1000	26"	139 ch.	2	4/2	27" x 26" x 17"	on-screen display	$1000
Fisher	PC-226	20"	181 ch.	none	2/1	19" x 20½" x 19¾"	on-screen display; sleep timer; var. audio output	$650
	HTD-900	27"	181 ch.	2	3/1	n/a	digital PIP; on-screen display; sleep timer; synthesized stereo	$1700
General Electric	8-2090	20"	155 ch.	2 two-way	2/1	10" x 5' x 18¾"	last-channel recall; on-screen display; parental lockout; sleep timer; square picture tube; unified TV/VCR remote	$670
	8-2789	27"	155 ch.	2	2/1	n/a	last-channel recall; on-screen display; parental lockout, sleep timer; unified TV/VCR remote	$1200

This chart lists only a small selection of deluxe stereo monitors currently available. Unless otherwise indicated, all the TV sets listed in this chart are color monitor receivers equipped with an MTS/SAP-compatible stereo tuner, headphone/earphone jack, and wireless infrared remote control. All information is provided by manufacturers and other industry sources.

Screen sizes are measured diagonally. Inputs and outputs refer to sets of stereo audio & video jacks; multiple RF inputs, when shown, can be used for connecting cable TV descrambling

that they count channels 2-13 twice (once for standard off-air reception and again for cable TV). This makes the "channel numbers game" yet another silly advertising ploy.

Even more significant, some befuddled consumers have bought cable-ready TV sets on the assumption that these sets will automatically allow them to watch HBO, Showtime and other Pay-TV channels for free, which isn't necessarily true. Some unscrupulous dealers even sell cable-ready sets to people who don't have cable, assuring them that they'll be able to receive every channel without any problem!

The problem of "cable-ready" or "cable-compatible" sets is bad enough, but there's an even tougher trend these days to contend with. Thanks to widespread scrambling, it's impossible to watch even standard broadcast stations on many cable systems with a cable-ready set alone. These systems routinely scramble ALL the channels —not just the Pay TV stations—which forces viewers to watch all programs through the cable company's convertor box. Needless to say, this virtually destroys the usefulness of any cable-ready TV tuner.

The moral: don't buy a cable-ready set unless your dealer will guarantee it will work with your neighborhood cable system. If there's any doubt, check with your cable company first. Some TV sets offer *dual RF inputs*, which provide a good compromise between cable-ready and standard tuners by allowing you to watch off-air shows from your roof antenna, or premium channels from the converter box, with relative ease.

MTS Stereo Tuners: Fans of NBC's "Miami Vice" already know that stereo is *the* big buzz-word for the 80's. There's no question that MTS (multichannel television sound) adds a dramatic new dimension to home entertainment—perhaps not as great as the difference between B&W and color broadcasts, but exciting nonetheless. While stereo programming is still relatively rare, all three networks promise to have dozens of stereo series, specials and movies on their fall schedules later on this year.

Practically all the top-priced sets on the market offer built-in MTS tuners, and virtually all of them allow you to listen to either the stereo soundtrack or a third "SAP" channel, usually employed for a foreign language. Many sets allow feeding their outputs to larger speakers for fuller, richer sound —an important feature for those who make the monitor the cornerstone of your home entertainment room.

Beyond these features, there are a few extra frills that definitely fall into the "Silly-to-the-Extreme" category. At least one manufacturer lets you answer your telephone with some of their deluxe TV sets. This is a little absurd, and expensive, besides, considering you can save money and get better quality by buying a separate speakerphone. Other companies continue to make huge, ugly woodgrain consoles designed to fit into any living room decorated in a Louis XIV motif. We suggest you'll get better value for your money if you evaluate TV's solely on the basis of their features and performance, and not on their ornate cabinetry.

THE ELECTRONIC WINDOW

But enough about gimmicks. If you just want the best *looking* set money can buy, what you need is a monitor/

Continued on page 60

Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
Hitachi	CT-2269	22"	181 ch.	2	2/2 (also 2 RF)	n/a	last channel recall; sleep timer	$880
	CT-2668	26"	181 ch.	4	2/1 (also 2 RF)	27" x 26" x 17"	last channel recall; sleep timer	$1100
JVC	AV-2090	20"	142 ch.	2	3/1	18½" x 21¼" x 20"	on-screen display; sleep timer	$900
	AV-2690	26"	142 ch.	2	3/2 (also 2 RF)	33" x 29¼" x 20¼"	full square picture tube; on-screen display; sleep timer; unified TV/VCR remote	$1150
Kenwood	KMT-1026	26"	142 ch.	2	2/1 (also 2 RF)	24½" x 26" x 19"	last channel recall; external speaker terminals; synthesized stereo (from mono programs)	$1250
Magnavox	RG-4378	20"	178 ch.	2	2/2 (also 2 RF)	18¾" x 19¼" x 18½"	external speaker terminals; on-screen display; parental lockout; RGB input; unified TV/VCR remote	$775
	RG4552PE	27"	178 ch.	2 (two-way)	2/2 (also 2 RF)	31¼" x 49½" x 21¼"	last channel recall; on-screen display; parental lockout; sleep timer	$995

devices for Pay TV programs. Cabinent size is height x width by depth, rounded off to the nearest quarter-inch. All prices are manufacturer's suggested list; actual selling prices are set by dealers.

All monitors shown are rated at approx. 350-500 lines of horizontal resolution. Due to the lack of uniformity in measuring systems between manufacturers, this specification has been omitted from this chart. As to weight, most 19" and 20" monitors weigh approximately 50-60 lbs., and 26" and 27" sets weigh approximately 120-150 pounds.

Monitors/Receivers

receiver with the sharpest picture, the blackest blacks, the whitest whites, and the most realistic fleshtones you can see outside of a movie theater. Most of the sets in the upper stratospheric price range boast a plethora of extra circuits and exotic tubes designed to get the very best performance out of our NTSC television system. Unfortunately, such high-performance sets generally also come with a lot of extra bells and whistles, too. It's hard to buy one without the other—sort of like trying to buy a Cadillac or Mercedes without a radio or air-conditioning.

Which is the best all-around TV brand? Well, at the risk of sounding like a company spokesman, as a general rule of thumb, I think it's hard to go wrong by simply buying the best Sony you can afford. Sony has consistently offered the best picture quality and the best dependability of any consumer TV set or monitor in the country, and the six or seven Sony sets I've owned over the years have all served me well. Most of the leading consumer magazines consistently put Sony at or near the top of the list for picture quality and features, and Sony monitors are also highly-rated for dependability, requiring little service over a period of many years.

Here's a list of important TV picture quality buzzwords you should ask for in any super-deluxe TV set or monitor:

Digital TV Circuitry: With the popularity of the Compact Disc, the term *Digital* has become the "in" word of the 80's. You'll see "digital" labels on everything from washing machines to car dashboards, and now, TV sets as well. Just a few toppriced models use a special circuit chip originally developed by ITT, a European firm. This chip streamlines the video processing inside the set, using a microprocessor to automatically control and adjust picture quality. Right now, this chip is extremely expensive, and with its complementary circuitry, can easily add anywhere from $250 to $500 or more to the cost of the basic set or monitor.

Digital chips can also be used to improve sharpness in a few high-priced TV models. *Non-interlaced scanning* is a new idea that effectively doubles the tube's resolution, making it appear to be twice as sharp as a conventional set. Toshiba has been in the forefront of this area, and no doubt they'll be joined by other manufacturers in the years to come. Obviously, there's no way to "interpolate" this added sharpness with some kind of visual drawback, so be wary of any extravagant claims in this department.

The added plusses of digital don't stop with picture quality. There's a plethora of other special effects that digital circuits can add to any TV, and perhaps the most enjoyable benefit is *PIP*: a small "picture-in-picture," which can be made to appear anywhere on the screen, allowing you to watch two TV shows at once and flip back and forth between them. Eventually, PIP could

Continued on page 62

Yamaha YM-965 26 inch video monitor/receiver.

Toshiba CZ-2697 high resolution monitor.

Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
Marantz	MR-260	26"	142 ch.	2	3/2 (also 2RF in)	24½" x 26" x 19"	sleep timer	$1000
Mitsubishi	CS-2053R	20"	139 ch.	2	2/1	18¾" x 20¼" x 19"	last channel recall; on-screen display; sleep timer	$670
	CS-2670R	26"	139 ch.	2	2/1 (also 2 RF)	22¾" x 27¾" xz 19½"	digital PIP; on-screen display; RGB input; parental lockout; sleep timer; synthesized stereo (mono programs)	$1300
NAD	MR-20	20"	139 ch.	2	3/2 (also 2 RF)	19¼" x 21" x 19"	last channel recall	$900
	MR-26	26"	139 ch.	2	3/1 (also 2 RF)	24¼" x 27¼" x 20"	last channel recall	$1200

Quazar's new model TT9000YQ.

Sony's all new XBR-PRO monitor.

Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
NEC	CT-2020	20″	142 ch.	2	2/3 (also 2 RF)	19¼″ x 20½″ x 19″	last channel recall; on-screen display; sleep timer; unified TV/VCR remote	$800
	DT-2680A	26″	142 ch.	2	3/5 (also 3 RF)	22½″ x 26″ x 19½″	digital PIP; last channel recall; on-screen display; parental lockout; RGB input; sleep timer; synthesized stereo (from mono programs); unified TV/VCR remote	$1600
Panasonic	CTG-2083R	20″	155 ch.	1	2/1	19″ x 20″ x 20½″	RGB input; square picture tube; unified TV/VCR remote	$1500
	CTH-2600R	27″	155 ch.	2	3/1	24″ x 27″ x 22½″	on-screen display; parental lockout; sleep timer; square picture tube; unified TV/VCR remote	$1300
Pioneer	SD-2601	26″	139 ch.	2	3/2 (also 2 RF)	27″ x 26″ x 17″	on-screen display; unified TV/VCR remote	$1200

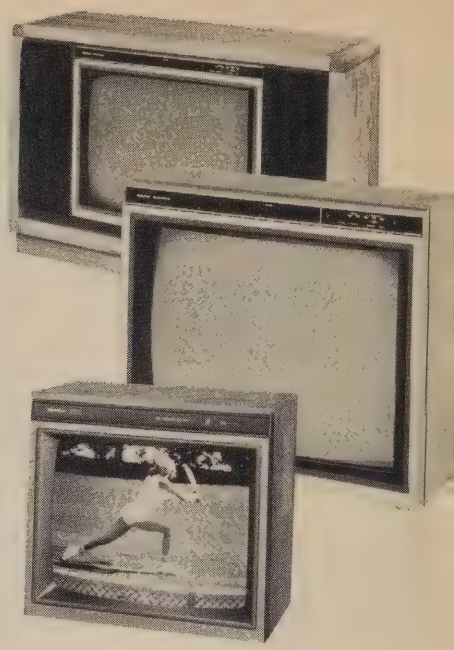
Monitors/Receivers

show three, four, or more screens at one time, for the ultimate in on-screen confusion!

Other digital PIP features include "freeze frame," capturing the image like a still camera. So far, this feature has only been available for the small PIP picture itself, and not the larger image. Some sets allow you to "strobe" the frozen image, giving you a sort of artificial slow-motion effect over a period of time. One useful feature promised for future digital sets is "ghost elimination," which uses digital hocus-pocus to reduce picture interference caused by reception gremlins. It's expected to be available by sometime next year.

Fancy chips are one thing, but the single most important performance factor in any TV monitor is its *picture tube*. Tubes have progressively been getting flatter and squarer these days, resulting in screens with a nearly perfect rectangular shape. This is quite a departure from the old curved tubes of yesteryear, which were flawed with edge distortion (convergence error) and image cutoff (overscan) problems. Toshiba was the first to introduce a "FST" (flat-square tube) TV, back in 1983; similar models are now available from virtually every manufacturer, in a variety of sizes and prices.

Videophiles will be pleased with the news that the picture sharpness and color clarity of today's '87 TV sets has been greatly improved, coming in-



Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
Proton	620	20″	139 ch.	2	2/2	20″ x 21″ x 19½″	last channel recall; on-screen display; RGB input; sleep timer	$850
	627	27″	139 ch.	2	3/3	24″ x 27½″ x 19″	last channel recall; RGB input; sleep timer	$1300
Quasar	TT-6298YW	20″	125 ch.	2	3/3 (also 2 RF)	19½″ x 20½″ x 20¼″	last channel recall; on-screen display; RGB input; sleep timer	$990
	TT-9000YQ	26″	155 ch.	2	3/1 (2 RF)	24″ x 27″ x 22¼″	full square picture tube; last channel recall; on-screen display; parental lockout; RGB input; sleep timer; designed for floor or table viewing	$1900
Radio Shack	TC-1000	20″	140 ch	2	2/1	18″ x 20¼″ x 18½″		$500
RCA	FMR-570R	20″	176 ch.	2	2/2	19½″ x 20″ x 16″	last channel recall; on-screen display; square picture tube; unified TV/VCR remote	$590
	GMR-2760	27″	176 ch.	2	2/2 (also 2 RF)	30½″ x 42″ x 19¼″	square planar picture tube; last channel recall; on-screen display; unified TV/VCR remote	$1100
Sansui	SV-M26AV	26″	140 ch.	2	1/1	24½″ x 26″ x 19″	last channel recall; unified TV/VCR remote; on-screen display; sleep timer; synthesized stereo (from mono programs)	$1000
Sanyo	AVM-210	20″	140 ch.	2	2/2		on-screen display; RGB input; sleep timer	$550
	AVM-275	26″	181 ch.	2	2/2	27″ x 26″ x 17″	on-screen display; sleep timer	$800
H.H. Scott	HT-200	20″	139 ch.	2		20″ x 17½″ x 19″	last channel recall; on-screen display; square picture tube; sleep timer	$530
Sharp	20LV76	20″	110 ch.	2	3/2	18″ x 19″ x 18½″	last-channel recall	$690
	26LV96	26″	140 ch.	2	3/2	22″ x 26″ x 20″	on-screen display; sleep timer	$1300

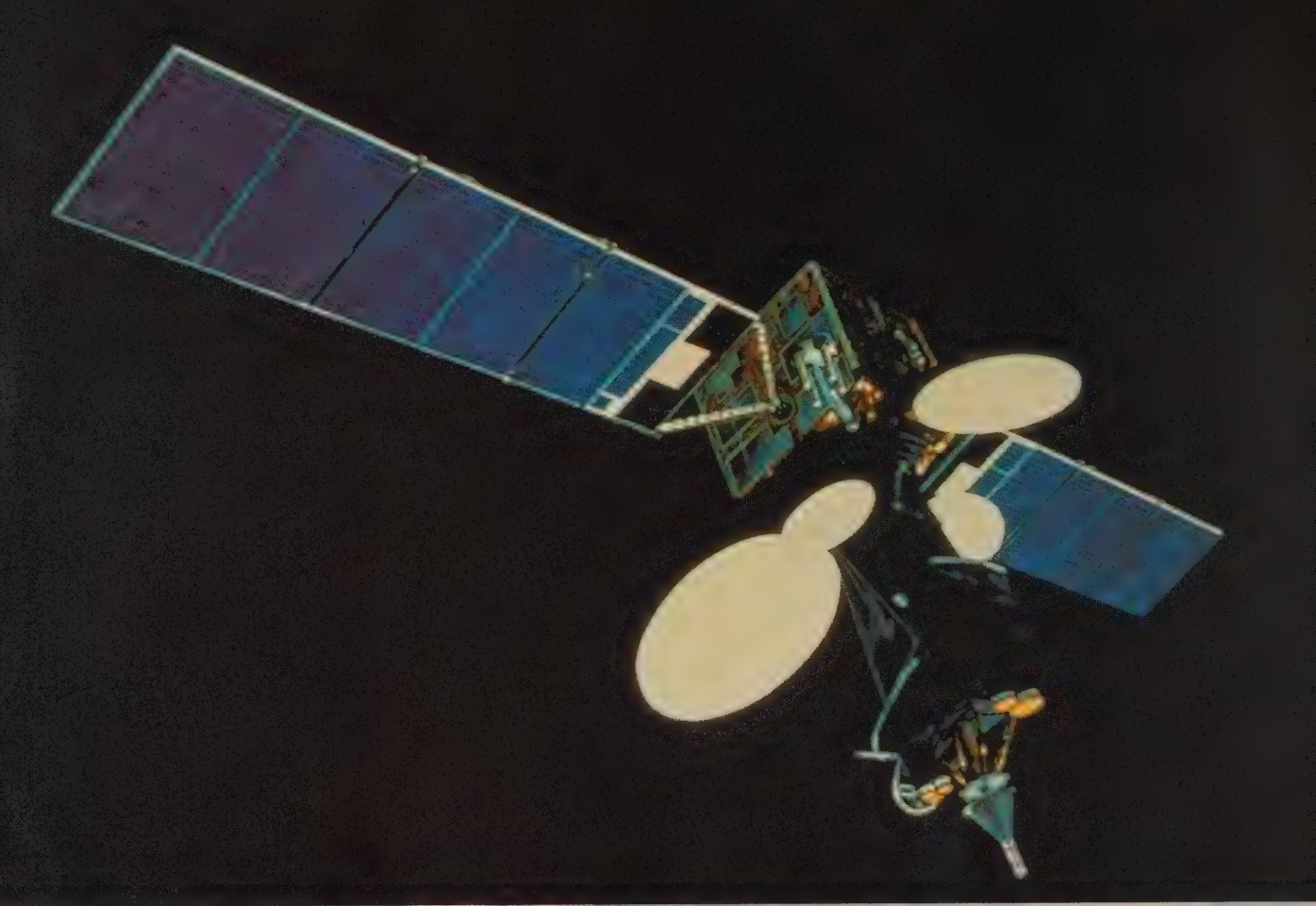
creasingly closer to the level of megabuck studio monitors. The secret is the use of new picture tube designs like RCA's COTY (used by GE, Hitachi and Zenith) and Philips' CFF (used by Magnavox, Quasar, Sanyo, Sharp, and Toshiba), which improve resolution by using a streamlined optical system, coupled with comb filters to separate the color and sharpness signals, insuring maximum clarity. Sony's new "Mirror Black" and "Microblack" tubes offer greatly improved contrast, combined with probably the best overall picture quality currently available.

Of course, tubes aren't the only factor in picture quality. High-performance sets also have a plethora of special circuits designed to get the maximum picture quality onto the screen. Most of these monitors feature *100% DC Restoration*, which provides blacker blacks instead of the usual milky greys seen on conventional sets. This feature usually requires beefier power supplies, adding to the cost and weight of the set. Having bigger power supplies also makes sure that the set can handle rapid black-to-white transients—perhaps the toughest test for any modern TV.

Screen Sizes: Virtually all high-performance sets boast larger screens, too, in the 26 inch and 27 inch category. It can be argued that some 19 inch sets actually offer superior performance, because some of them have a smaller *aperture grill* size than their larger brothers, but 25 inch is generally considered to be the optimum size for family viewing. Larger picture tubes, up to a whopping 40," are also available; see our previous issue for more details.

Whether you shop for economy, features, or performance, there are literally hundreds of excellent sets out there, all offering outstanding value. While it's still possible to get "taken to the cleaners," and get stuck with a strange off-brand TV lemon, if you stick to the major brand names and use our article as a reference, you should have no problem battling your way through the electronics jungle out there. Let your eyeballs—and your wallet—be your guide.

Manufacturer	Model	Screen Size	Tuner	Speakers	Inputs/ Outputs	Cabinet Size	Other Features	Price
Sony	KV-20HFR	20"	181 ch.	2 (two-way)	3/1 (also 2 RF)	n/a	on-screen display; parental lockout; synthesized stereo (from mono programs)	$940
	KV-2786R	27"	181 ch.	2 (two-way)	3/1 (also 2 RF)		digital PIP; on-screen display; parental lockout; RGB input; sleep timer	$1750
	XBR-PRO	25"	181 ch. (opt)	2 (opt)	4/2 (2 RF on opt. tuner)	n/a	comb filter switch	$1700
Sylvania	RKF0198	20"	178 ch.	2	2/2	18¾" x 19¼" x 18½"	last channel recall; on-screen display; parental lockout; RGB input; unified TV/VCR remote	$1500
	RPF-702	27"	178 ch.	2	1/1	23½" x 26½" x 19½"	last channel recall; on-screen display; parental lockout; RGB input; unified TV/VCR remote	
Teknika	FH-202	20"	178 ch.	2	2/1 (also 2 RF)	16¾" x 23½" x 18¾"	last channel recall; on-screen display sleep timer	$650
	FV-261	26"	140 ch.	2	3/2	24" x 25¾" x 19½"	last channel recall; on-screen display sleep timer	$1000
Toshiba	CZ-2094	20"	139 ch.	2	3/3	18¾" x 19¾" x 18½"	digital PIP; flat square picture tube; last channel recall; 2 RGB inputs; on-screen display; sleep timer	$1380
	CZ-2697	27"	181 ch.	2	3/3 (also 2RF inputs)	23¾" x 25½" x 20½"	digital PIP; 2 RGB inputs; on-screen display; sleep timer	$1700
Yamaha	YM-960	26"	142 ch.	2	2/3	24¾" x 26" x 19½"	last channel recall; on-screen display; synthesized stereo (from mono programs); sleep timer	$900
Zenith	SC-1935W	19"	178 ch.	2	2/1	19" x 20½" x 19"	last channel recall; unified TV/VCR remote	$600
	SC-2793	27"	178 ch.	4 (Bose speakers)	2/2	30" x 30" x 19"	on-screen display; parental lockout RGB input; synthesized stereo (from mono programs); unified TV/VCR remote; available in 3 cabinet styles	$1400



The Revolution In TV Picture Quality

Tomorrow Everyone Will Receive A Superior Picture ...And It Will Come By Satellite

by BOB COOPER, JR.

Much of the attention of the video world during the last half decade has focused on the tremendous increases in program diversity offered to anyone with satellite and/or VCR capability. Long gone are the 50's when most Americans felt priviledged to have access to the three major networks. A home without cable (nearly 50% now have cable) or a home without VCR capability (more than 40% now have this ability) is an unusual home indeed. Virtually everything you have read or heard about spoke to the issue of programming *choice* and the almost limitless reservoir of entertainment and educational material available to you. The last new technical breakthrough related to an improvement in television reception *quality* dates back to at least 1980 when home dish reception first became commonplace.

Television reception quality, as you know it, was cast in concrete way back in 1939-40. That's when a national 'standards committee' sat down to work out the technical parameters of television transmission. The first standards were really slightly modified from a proprietary system created by RCA and first demonstrated at a World's Fair in 1939. These standards stayed with us unmodified until the early 1950's when color came on the scene. In 1952, the FCC decided that our present color system, called NTSC, would become a new, modified national standard system for color. The color system was piggy-backed onto the twelve year old black and white system in such a way that viewers with black and white TV sets could receive the color transmissions in black and white without penalty. This was an important consideration since the addition of color to the black and white only transmissions might have been done in such a way that all black and white receivers would have become useless. One seriously considered proposal, from CBS, would have created a color system which produced color which could not have been received at all (even in black and white) on a black and white receiver. The key word here was *compatible*; i.e. in adding color to the basic black and white transmission the viewer not lose the ability to receive the programming.

So the foundation for television we receive today was really laid in the late 1930's. As you might imagine, there have been numerous improvements in technology in the intervening years. One of the most significant relates to something called picture definition. Here is what that is all about.

The quality of a picture depends almost totally on the fineness of the picture detail. An image is scanned electronically and broken up into some predetermined number of horizontal lines. The greater the number of horizontal lines, the greater the picture resolution; *detail.* Ideally, there would be an infinite number of lines and then the picture would be resolved with the same clarity as your eyeball sees in real life. However, each scanned line requires independent electronic processing and there is a limit to the capacity for the number of lines to be processed. In 1939, a 525 line scan number was considered the maximum number of lines that could be processed with then-current technology.

This is 1987, not 1939. Technology has improved, dramatically. We are much closer to being able to create an infinite number of scanning lines today than in 1939. It is now practical to break up each image into well over 1,000 lines and still control those lines with the electronic scanning system.

Naturally, if we can now have more lines of scanning, we can have far higher quality pictures. So how do we get from where we are to where we would like to be?

There are two possibilities. The first is that a new television system be created which ignores the present system totally. Just as the CBS color system considered in the early 50's ignored the existing black and white sets then in existence, a new high resolution/high definition system could appear as soon as tomorrow which simply starts all over again. There are arguments for this approach. It would cost

New Video Quality On the Way? - *The Japanese already have twice the resolution (clarity) on their domestic TV sets as we do. We could have it too, except for outmoded standards established in the 1950s. New superstations broadcasting true high resolution super quality TV could be in business by next year! Will they make current sets obsolete for the videophile?*

less to implement, and it could be done very rapidly.

The other possibility is to hold out for a compatible system; one which would allow existing receivers to continue to receive the programming in the present (NTSC-525 line) form, while adding the capability for those consumers who wish to have high definition reception and the advantages of improved picture quality. This technique will take longer to implement, and *may* cost more to bring into use.

Either approach, compatible or non-compatible, presents an interesting engineering challenge to system designers. Here is what that is all about.

Each scan line requires a certain amount of space or time to transmit. The greater the number of scan lines, the greater the amount of space (or time) required to transmit a complete picture. The picture you now view on the screen changes 30 complete times each second. For comparison, in Europe using a non-NTSC system, there is a complete change in picture 25 times per second. If you have traveled to Europe your North American eye may have noticed a flicker in the European images. That faint flicker is caused by your American eye being accustomed to 30 pictures per second rather than 25. Your mind *knows* what a picture is supposed to look like and when you first sit down to watch European TV, your brain *remembers* the 30 picture per second rate!

To increase the number of lines scanned in the picture we must also increase the amount of transmission space available to transmit the added lines. This increase affects the amount of spectrum space or channel width required. Our present NTSC system requires a channel width of six megahertz. If you were to double the number of lines, from 525 per picture to say 1,050 lines, it basically requires that you double the amount of channel bandwidth from six magahertz to 12 megahertz. If six megahertz is one quart, 12 megahertz is two quarts.

So, one of the first real problems is to somehow figure out where you will fit into the radio spectrum channel widths that are twice as wide as the present six megahertz wide channels. Spectrum space is a limited resource and while back in 1939 it might have been possible to assign TV channels 12 rather than 6 megahertz of space, today there is no such vacant space remaining. In other words, if more than 1,000 lines requires twice as much space as 525 lines, we need new channels twice as wide as our present channels. And, the spectrum is already used up; no room remains for this type of expansion. One possibility: take our present 82 channels (12 VHF and 70 UHF) and turn them into half that number (41), each twice as wide as the present channels.

To say 'there is no spectrum left' to implement double-wide channels is a slight mis-statement. There is no space left in the region where regular television operates. But there is spectrum space available in the microwave region; the same microwave region where satellite television operates.

The body that governs U.S. television, the Federal Communications Commission, has begun an investigation into high definition television. Earlier this year, a special demonstration was held in Washington at the FCC, and several Japanese firms operated a test high definition system in an elaborate show and tell. To make it work, in demonstration form, the FCC had agreed to allow use of two side-by-side UHF channels (12 megahertz of spectrum). The test was exciting, and it caught the attention of several important groups such as the National Association of Broadcasters; the trade association of all broadcasters.

Now, if you were the owner of a television station, you would be concerned that your television station property not become outmoded. As long as all television stations were transmitting in the 525 line standard, you have no worries. But, suppose your competitor elected to upgrade and begin transmitting in a higher definition, using a system that was compatible with *either* the present 525 line system *or* the new high definition standard? Would that not worry you?

Of course it would; your television station value or net worth depends upon your acceptance in the marketplace. You cannot afford to sit back and watch a competitor move ahead with a newer technology and leave you behind.

The FCC is sensitive to this and here is one of the plans being hatched.

1) First you take a segment of the satellite microwave band and you designate it for direct-to-home use.

2) Next, you allow the existing broadcasters to operate their existing 525 NTSC service just as they are now doing. But, you also allow them to operate a new, high-definition service in the new satellite-microwave band.

Now the public has a choice; it can continue to watch 525 low definition TV on their local antenna or on cable, or they can buy a small DBS-type Ku band dish and receive the programs in high definition format. And because the new high definition system is (hopefully) compatible (between 525 line NTSC and the new, higher definition format) even people with older-style Ku band NTSC dish systems can receive the programming in the low definition format.

High definition television is certainly the next quantum leap forward in video transmission. In addition to having more scan lines per picture, resulting in greatly increased resolution, the new formats being discussed also change the aspect ratio of the picture. Present pictures are four units wide by three units high; ie. the height of the picture is one-third less than the width. Movie theaters typically have a 5x3 aspect ratio; the picture has five units of width for each three units of height. The new high definition television systems would follow the movie format and give you wider pictures at the same time they increased the picture detail.

The technical details of any of the high definition systems border on mind blowing. With new imaging technologies, flat screen displays less than two inches thick of virtually any size you wish, wide screen pictures, with twice the resolution or picture detail of present NTSC video. And audio to match; digital, stereo sound with a choice of language channels, on screen or off screen closed captioning for the hearing impaired. After nearly 50 years of NTSC video and audio, this is a gigantic leap for video-kind.

Alas, there are decisions, hard decisions, yet to be made. The most important decision relates to *who* will own and operate this new technology. The existing FCC licensed broadcasters believe they have a right to getting first preference. Admitting that there is no spectrum space available in

the present VHF and UHF spectrums for such a wide bandwidth service forces the FCC to consider alternatives. The technology level of satellites, operating at either the present (albeit new) Ku band, or even the next higher (Ka) band would allow a Memphis station to have a focused footprint coverage area on earth roughly equivalent to its present direct transmission (VHF/UHF) reach. One of the beauties of focused Ku or Ka band transmission patterns is that local TV stations in Memphis, Minneapolis, Miami and Modesto could all use the same transmission frequency, from space, without interfering with one another. They could even do this from the same satellite. That would maintain the regional or local concept which the FCC has for city by city licensed broadcasters. Unlike C band (present day) satellite coverage where one transponder covers an entire continent more or less equally with only *one set* of programming, spot-beam technology put to use at Ku or Ka frequencies would allow frequency sharing between cities separated across the continent.

COSTS?

The first cost is to the broadcaster. Creating an uplink is not cheap nor will the conversion to a new high definition transmission format be inexpensive. But broadcasters typically operate with a 30%-40% net profit margin and in a market such as Charlotte, North Carolina, a TV station throws off between $3 million and $5 million *per year* in taxable income. So, for TV broadcasters in the first 100 markets or so, it is entirely practical for a station owner to take his present excess profits and put them into his future; high definition, direct-from-space, TV service.

The FCC likes this concept and there is precedent for allowing a TV broadcaster to continue to operate his present VHF or UHF channel while at the same time adding a Ku/Ka satellite wide band service. In the 40's and 50's as FM broadcasting was getting started, the FCC allowed stations with established AM service to add FM in the same market even though that meant the stations essentially had two channels in the same market at the same time. This duopoly was allowed in the interest of getting FM off the ground. The same rationale would give existing broadcasters first crack at the very desirable space-transmitted high definition service as well.

Space channels will become a valuable commodity, just as a license to operate a VHF or UHF channel is a valuable commodity today. Recently, a single TV station in New York City sold for the unspeakable sum of $500,000,000 plus. Just to put that number in perspective, if you had $500,000,000 to spend, you could buy and launch *more than three* complete 24 channel satellites!

There will be a limited number of these space channels available. Their allocation, or assignment for use, will be hotly contested by hundreds of applicants. There will be fewer channels than applicants and the FCC will have to decide by what criteria the channels are assigned and who gets the right to use these channels. All of this will take some time.

While this is happening, the Japanese will be out there in the real world proving this new technology. By 1990, the Japanese will have in operation a new satellite carrying three of these high definition TV channels. The receiving systems, using ku band frequencies, for consumers will be available first in Japan. Everything about these new systems is new; the satellite receivers have to be capable of processing twice as much bandwidth as present day receivers, the TV sets or monitors must be capable of displaying twice as many lines per picture at 25% greater screen width. VCRs for this new service will have to be capable of recording the new high definition pictures; the audio systems will have to be capable of decoding and displaying digitally created stereo sound channels.

The Japanese approach to high definition is that we start from the ground and throw out NTSC totally. Some American and European inventors are following the same path. But one company in Florida (NYIT) has developed a compatible system capable of delivering the new, wide screen and high definition service while at the same time allowing all present receivers to continue receiving the same broadcasts in NTSC. The effect, for NTSC receivers, will be that they get every other picture line and lose the outer edges on the picture. Most agree that is better than getting nothing at all.

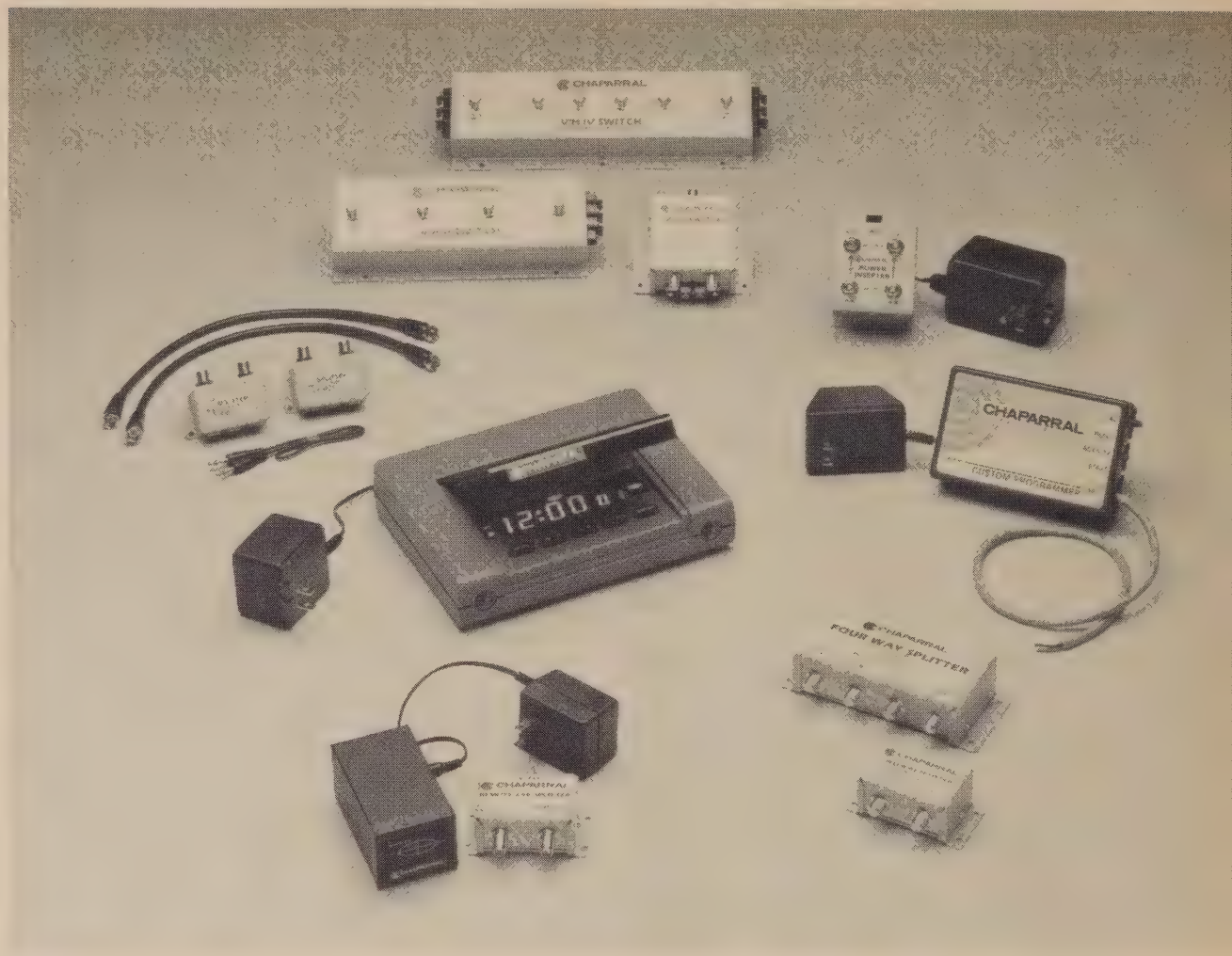
The aggressors in this scenario to date have been the Japanese. World-wide, they believe it is in the best interests of all users of television that there be a single, world standard. At the present time we have three widely used systems (NTSC, PAL and SECAM) and then we have variations of each (PAL-M, PAL-B and so on). The practical effect of multiple standards is when a television program or news event is transported from Europe to some other area, before the programming can be used in the destination country, it must be standards-converted to the recipient country's format. This is costly and slows down the instant use of materials transmitted with the speed of light via satellite. The Japanese believe that while the broadcasting world is giving serious consideration to a next generation of video, using higher definition and wider screens, it should also consider making one standard truly worldwide.

Nationalistic interests aside, such a universal adaption of a single standard would also greatly reduce the cost of TV receivers since all receivers would be uniform no matter where they were manufactured or used. Yes, that works to the long term export interests of countries such as Japan, Korea, and Taiwan but it also produces tremendous benefits to the world's TV consumers.

There is a movement here to change television. It is not going to happen overnight, but with the aggressiveness exhibited in Japan on a domestic level, it is happening none the less. And the official attitude at the American FCC, and the considerable interest demonstrated by the U.S. television broadcasters indicates that the high definition fever will not be far behind within the USA.

The satellite connection is interwoven through all of this. For it will be through satellites and because of satellites that a space in the spectrum will be found to house this new technology.

Home satellite systems may be experiencing reduced sales at the present time, but the future, when high definition broadcasts begin, looks very bright indeed. And once you have experienced the wonders of high definition, wide screen video, you simply have not seen television as it can really be.



Accessories That Help You To Make The Right Hook-Ups In Your Home Entertainment Center

MAKING

by DAN CHMIELEWSKI

Today's videophiles are more careful than ever when it comes to shopping for new sophisticated home entertainment electronics. They consult magazines, like this one, and commit product reviews to memory. They journey to audio/video stores to see first hand how the newest consumer electronics gear stacks up to their stringent demands. However, many of these videophiles could be getting much more from their expensive home entertainment systems by merely adding relatively *inexpensive* audio/video accessory products.

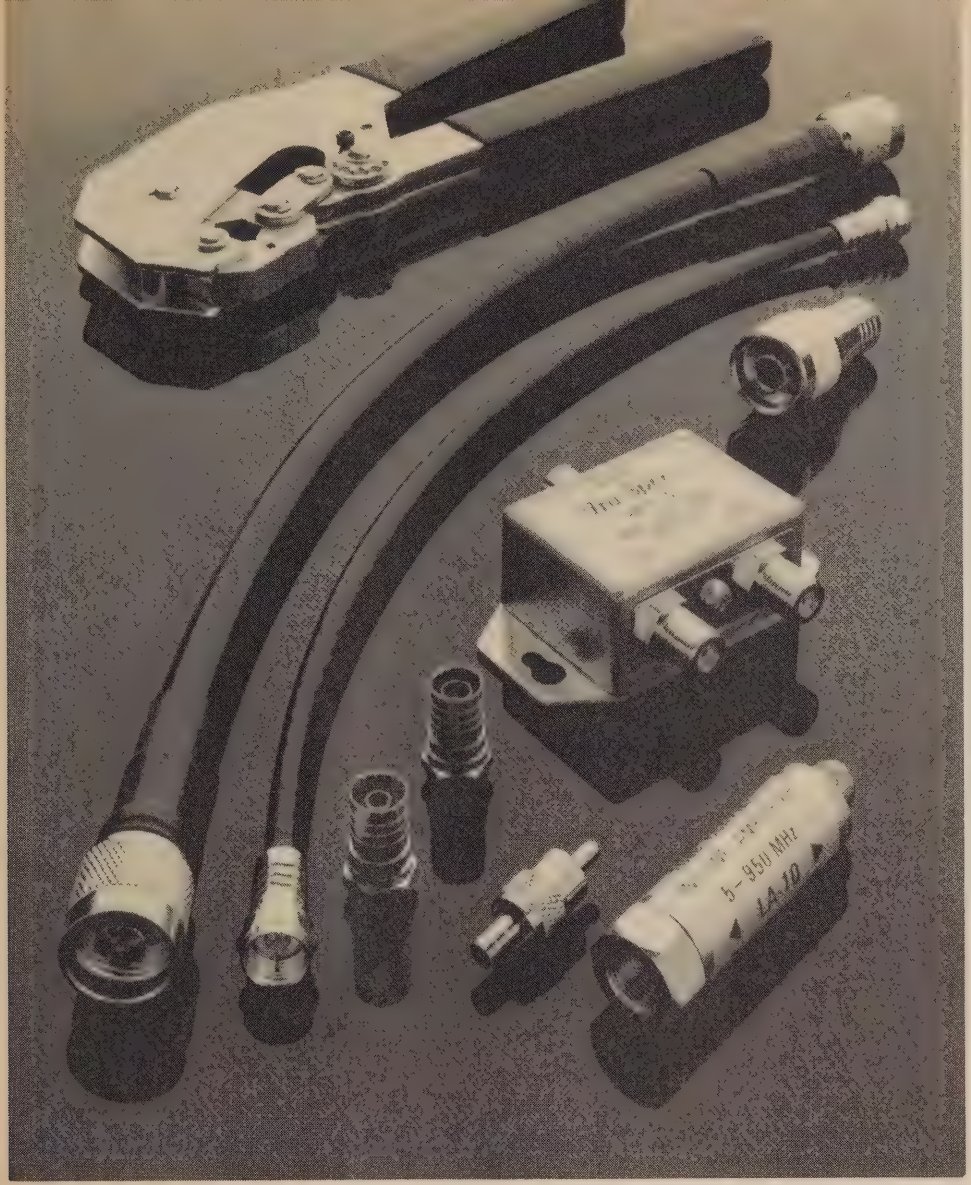
Accessory products can "marry" a satellite TV system, rack stereo system, VCR, and wide screen TV set for *total* home entertainment even if the components are different brands. The same careful shopping practices used for selecting audio/video components should be used when choosing accessory products.

Audio/video retailers or satellite TV dealers are great sources of information on the best accessory products available. These dealers can offer suggestions for product applications and other details such as product reliability and durability.

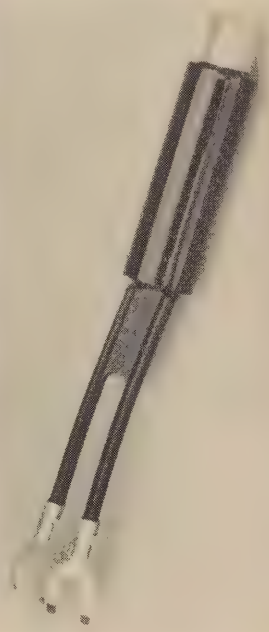
Here's a round up on some of the more commonly used accessory products and their applications.

VIDEO CONTROL CENTERS

A home video control center is perhaps one of the easiest ways to combine consumer electronics components in a



To Get Started - *Everything the home handyman needs to handle basic connections including crimper, plugs, cable and splitter are available at a nominal cost. An in-line 75-300 ohm transformer will convert cable signal to a TV's antenna lead.*



CONNECTIONS

home entertainment system. Pico Macom, Inc., of Lakeview Terrace, California, has developed two models—the Tru-Spec® HVC-1 and the HVC-1A—which provide independent selectionof a VCR, video games, off-air television, or satellite television at the touch of a button from one of four inputs.

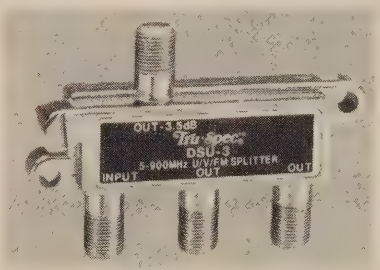
Video control centers have all the switching, distribution, and (for some units) amplification elements needed for multiple consumer electronics selection enclosed in an attractive wood housing. These units require high isolation to prevent signal leakage from the other output sources to the television set, shielding of internal components to prevent internal signal leakage which can interfere with clear video pictures from all sources, and an extended frequency range to handle components with different power levels.

Video control centers are a must for audio/video buffs with complete home entertainment systems. While these units are among the more expensive accessory products available, they are a still reasonable price. Video control centers can retail between $50 and $70.

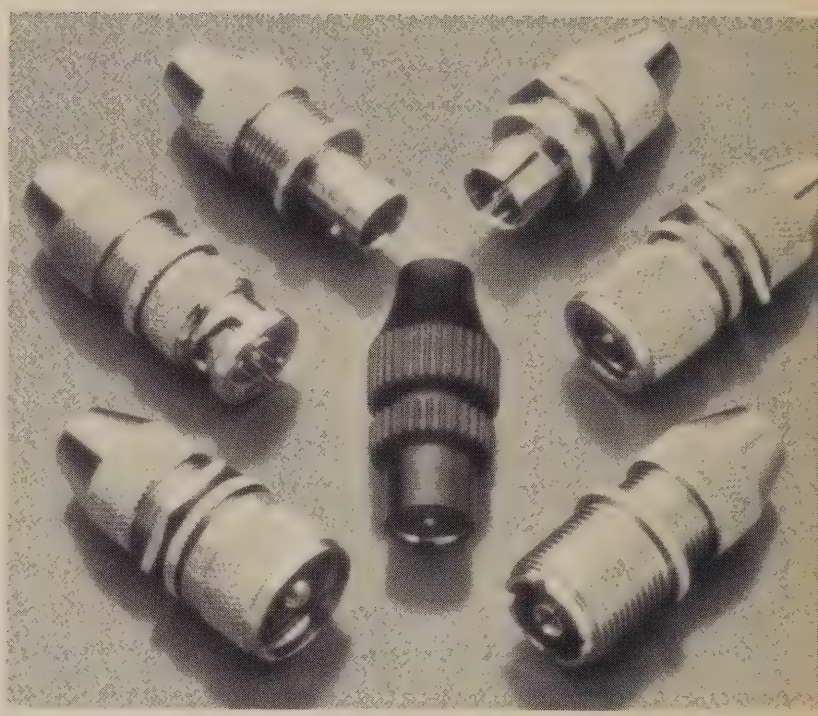
VCR/Satellite Kits

It's no surprise that cable and satellite television is beginning to cater to VCR owners. Many of the premium programmers have recognized that a growing number of their subscribers own a VCR and are showing quality films in the middle of the night so VCR owners can record them for

In-line security alarm system from Pico.



3-way splitter for home use.



Universal self-crimping connectors from E.F. Johnson Co.

Connection

later viewing. But without the right accessories, viewers will have a lot of cable switching to do.

The Tru-Spec VSK-I and VSK-II satellite/VCR kits eliminate the need to change cables and allows users to enjoy their VCRs or satellite systems at the flip of a switch.

The VSK-I features the patented AB-2 high isolation A/B switch and two coaxial jumper cables from Pico Macom. This model is designed for newer model high end VCRs which feature source input select switches. The coaxial cable lead from the VCR's "To TV" output and the incoming lead cable from the satellite receiver are connected to the two input ports on the AB-2. A jumper cable is installed from the AB-2's output port to the VCR's ANT IN port. A cable connects the VCR with the TV set. Users simply switch between video source "A" or "B."

The VSK-II operates in the same manner as the VSK-I, but is designed for older model VCRs which have no source input select switch. This configuration uses the SC-1 Signal Combiner and two coaxial jumper cables. Output cables from the satellite receiver and the off air antenna are connected to the input ports and the SC-1's output cable is hooked up to the VCR's ANT-IN port. Another jumper cable connects the VCR to the TV set.

Both satellite/VCR kits can be installed in seconds and allow users to watch satellite programming while recording off-air signals or vice versa without having the cumbersome task of connecting and reconnecting cables.

MORE ON CABLE

Jumper cables can do more than just connect different consumer electronics hardware. For example, satellite music services like MTV, VH-1, the Nashville Network, and many audio subcarriers transmit programs in stereo and many top-flight satellite receivers offer one or more modes of stereo audio. But few satellite dish owners patch this signal through their FM receiver for studio quality sound.

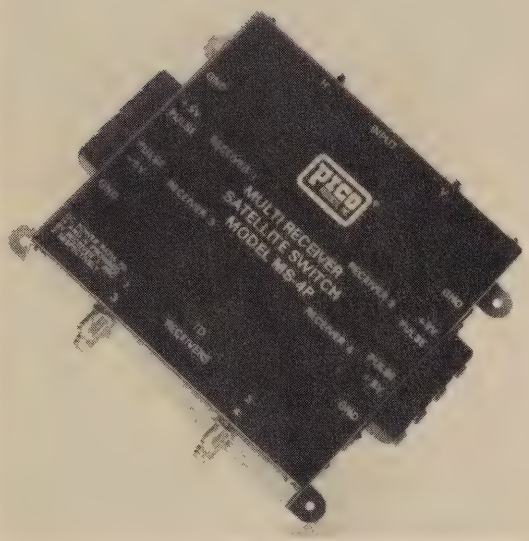
By installing two shielded jumper cables and RCA-F phono adapters from the satellite receiver's AUDIO OUT left and right output to the FM receiver's AUXILIARY left and right inputs, dish owners can "crank up" satellite stereo for their favorite video channel or audio subcarrier. Jumper cables with F-type connectors can also be used to dub videocassettes from one VCR to a blank tape on another VCR. Even though these applications are simple and inexpensive, few consumers take advantage of jumper cables in their total home entertainment system.

THE FACTS ON COAX

Cable, whether it is 75 Ohm round coaxial (also dubbed

A-B switch allows moving from cable to satellite input.

10db in-line amplifier from Pico-Macom.



Electronic switching is easy with a satellite matrix switch.

"coax") or 300 Ohm flat twin lead cable commonly used for older off-air television leads, is often a minor consideration by many consumers, yet is extremely important. Cable delivers signals—whether they be satellite, off-air television, or from other audio/video sources—from component to component in a home entertainment system. If consumers invest in good quality consumer electronics, they should invest in good quality cable.

Coaxial cable is preferred by more dealers and serious videophiles because it is more easily used with the latest consumer electronics hardware. Also, flat twin lead cable can act as an inadvertent off-air television antenna and receive "ghosted" UHF, VHF, and FM signals which interfere with clear television pictures. The inner wire of coax cable has a metallic shield and vinyl covering which makes this cable less susceptable to ghosting.

The two most common types of coax cable are RG-6 and RG-59. RG-6 cable is more common for satellite system installations because it carries more signal with less signal loss in longer cable runs. Most jumper cables used inside the home, where cable runs are much shorter, tend to be RG-59.

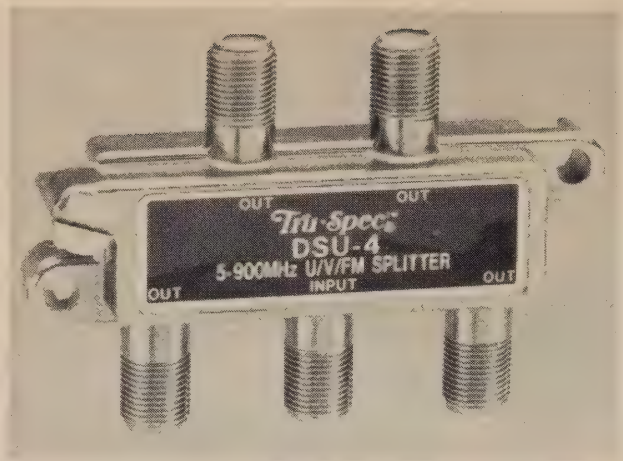
Most audio/video retailers and satellite dealers will recommend replacing a customer's flat twin lead cable with coax altogether. To avoid replacing the cable, or to use older model equipment with a home entertainment system, matching transformers can solve the problem.

To make flat twin lead cable interface with coax, use a 300 Ohm to 75 Ohm matching transformer. These particular models are available in two forms: with screw terminals for flat twin lead connection and varying lengths of coax for common F-type connections, or the "quick connect" model. To use coax jumper cables from the VCR to an older model TV with two VHF screw terminals, simply attach an ACU-1 75 Ohm to 300 Ohm matching transformer to the cable and make the connection to the TV set.

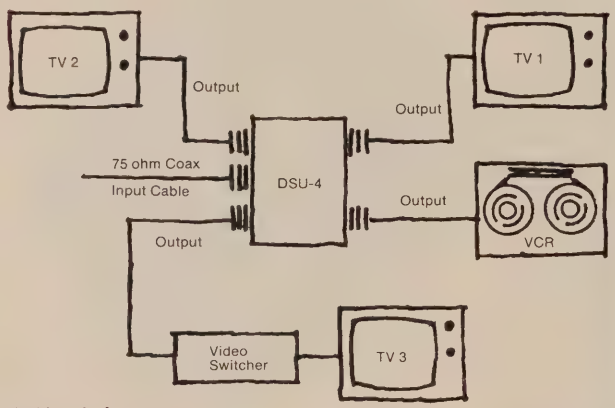
CONNECTORS, ADAPTERS, SPLICES

The least expensive accessory products—connectors, adapters, and splices—are also the most important. Connectors provide the link between raw cable (whether the cable is RG-6 or RG-59) and an electronic component. Adapters interface two different types of connectors. Splices bring together two connectors of the same type. Without these small items, the VCR would not be able to deliver pictures to the television set, the satellite dish could not be moved by the antenna positioner, the video game would not function with the TV screen, and so forth.

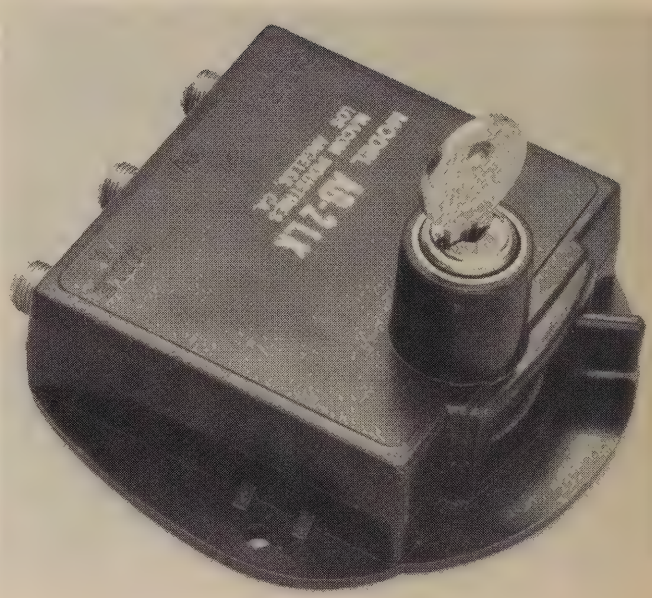
New components usually come equipped with built-in F-type connectors for easy coax hook-up. Older model



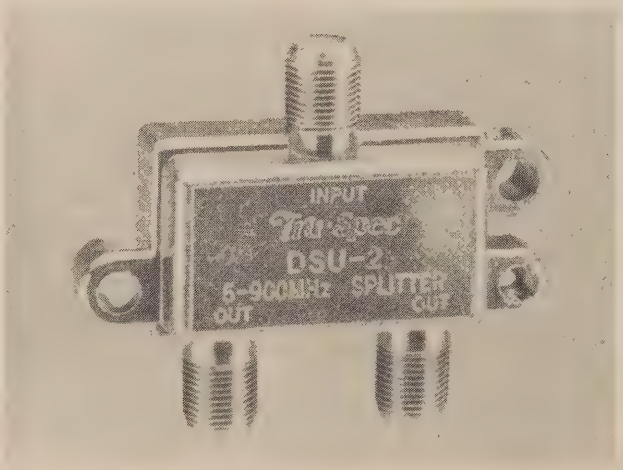
Splitters allow several TVs and other outputs to use same signal.

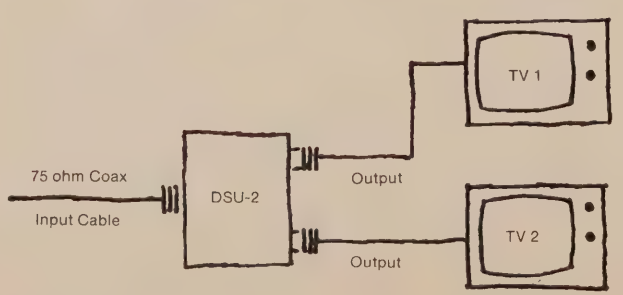


4-Way Splitter



Lock out the kids with this A-B splitter from Pico-Macom.





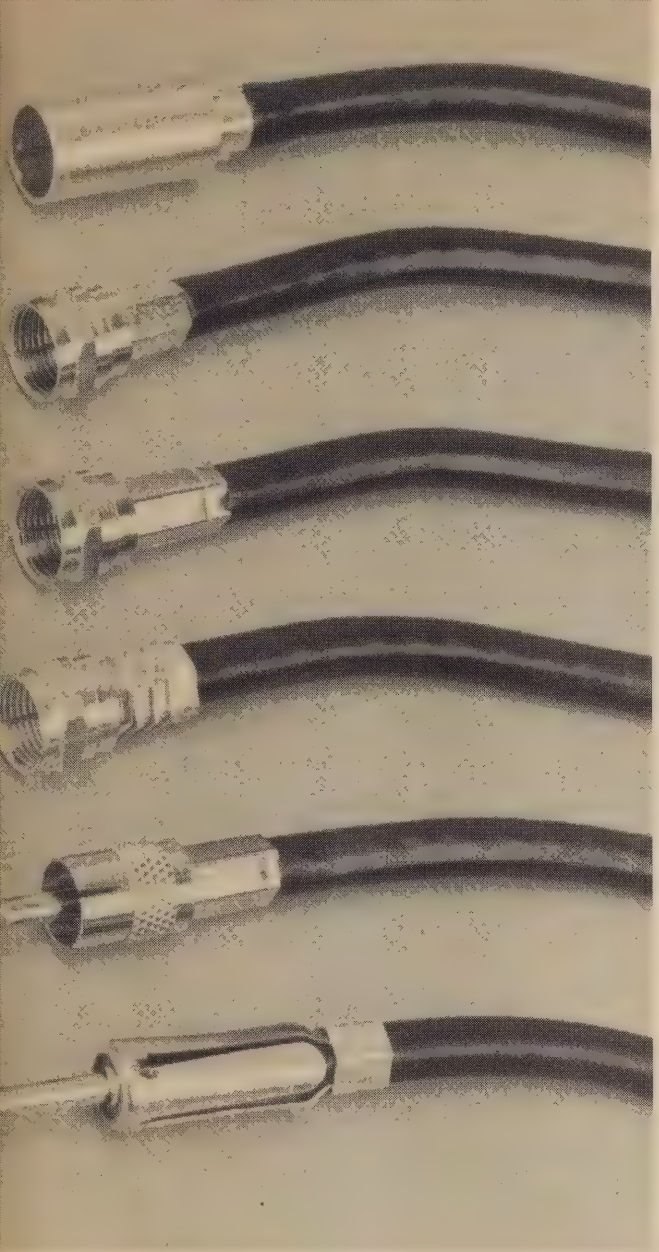
2-Way Splitter

Connection

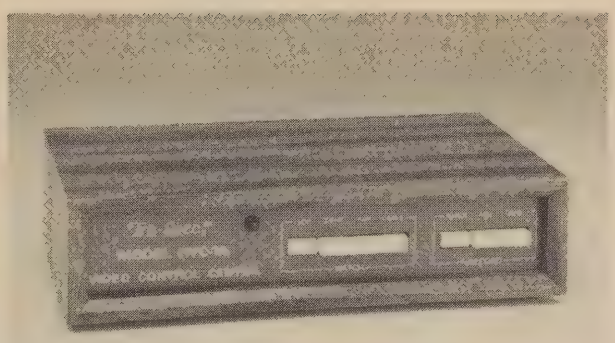
units have the 300 Ohm screw terminals, so a matching transformer may be needed for coax compatibility.

Here's a summary of some of the more common types of connectors, adapters, and splices available today:

- RG-6 connector with 1/4-inch separate ring.
- RG-59 connector with 1/4-inch separate ring.
- 75 Ohm F-type terminator.
- Male F-type splice.
- Female F-type splice.
- F-type Female to F-type Male right angle adapter.
- F-type connector with 1/2-inch attached ring.
- RG-6 connector with attached 1/2-inch ring.
- RG-59 connector with attached 1/2-inch ring.
- F-type Female to RCA Male adapter.
- 90° Female to Male N-type adapter.
- Male to Male 90° N-connector.
- Female to Female N-type splice.
- Male to Male N-type splice.
- RG-59 to RCA Male connector.
- RCA Female to F-type Male adapter.



Your connecting choices (from top): G-59P connector, two F-59s, F-59 with attached ring, RCA connector and MP-1 connector with attached ring.



Home video control with amplifier from Pico-Macom.

Solid state audio/video control center from Recoton.

Component installation and operations manuals will suggest the types of cable and connectors, adapters, or splices which should be used. Audio/video retailers, electronic component distributors, and satellite dealers can also be helpful.

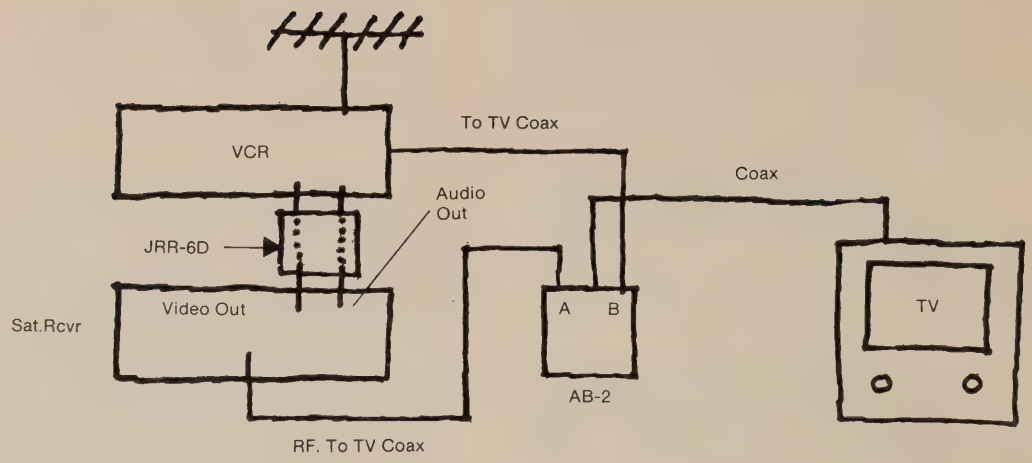
SWITCHES

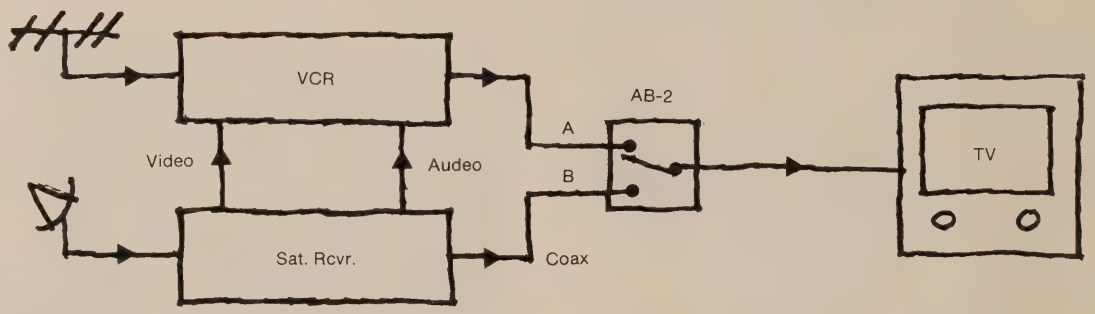
A/B switches, like the one used in the VCR/satellite kits, are becoming more commonplace. These devices allow users to select from two (or three) different signal sources to the television set. Users flip a switch or hit a button and choose between satellite television, off-air television, a VCR, or a video game. If there are several signal inputs incorporated with a home entertainment system, more than one A/B switch can be used in lieu of a video control center.

There are several models of A/B switches available. The unit which offers the highest amount of isolation is technically the best switch to get. These high isolation units are more expensive, but are much better at preventing signal leakage from one source input to the other, than other A/B switches with lower isolation figures.

Other model A/B switches offer a parental key lock option which prevents children from viewing a signal source of a questionable nature. This feature is especially popular with parents who receive premium channels from either cable or satellite television.

Another "switch" home satellite owners find useful is a multiple receiver satellite switch. A "matrix" switch has all the components needed for multiple system function and is a must for dish owners who wish to install a multiple system. The matrix switch provides each receiver in the system





Connection

with independent access to all transponders available from a satellite. Pico Home Satellite offers three configurations of these switches for compatibility with most home satellite receivers.

SIGNAL SPLITTERS & AMPLIFIERS

Signal splitters route incoming signals from one source to two, three, or four independent outlets via coaxial cable with F-type connectors. These devices are commonly used in master/slave satellite systems and in households with more than one television set. Signal splitters are less expensive than matrix switches, but provide only half the viewing choices to the slave receiver, usually channels with the same polarity as the one being viewed by the master receiver.

However, when television signals are split, up to 50 percent of the signal is lost. Amplifiers can give the remaining signal a boost and usually make up for much of the lost signal. Attaching an amplifier to the off-air antenna lead cable can increase poor off-air TV signals and provide better reception of local television broadcasts. Amplifiers should be placed near an A/C power source and where the signal begins to grow weak. Like splitters, amplifiers are available with more than two outputs. Satellite dealers can help with proper installation of these units.

SATELLITE SECURITY

Some accessory products for satellite dish owners should be mandatory, not optional. Satellite systems are vulnerable in two ways; theft of valuable feed electronics and from lightning.

While homeowner's insurance may cover the theft of feed electronics, a lightening strike on an *ungrounded* satellite dish can fry all the microprocessor based electronics included in a home entertainment system, including the satellite electronics, the VCR, stereo system, *and* the TV set. Worst of all, a lightening strike (or even a near miss) is considered an "Act of God" and is usually not covered by warranty let alone homeowner's insurance.

An LNA alarm device can alert dish owners to fed tampering and grounding accessories can prevent or minimize the damage from excessive electrical charges caused by lightning strikes. Proper grounding accessories typically costs less than $25 while the LNA alarm can usually be purchased for less then $50. In either case, these accessories are a wise investment for every dish owner.

Home entertainment systems can be as simple or complex as their owners would like them to be. With a little imagination and the right accessory products, consumers can get the most from home entertainment investment.

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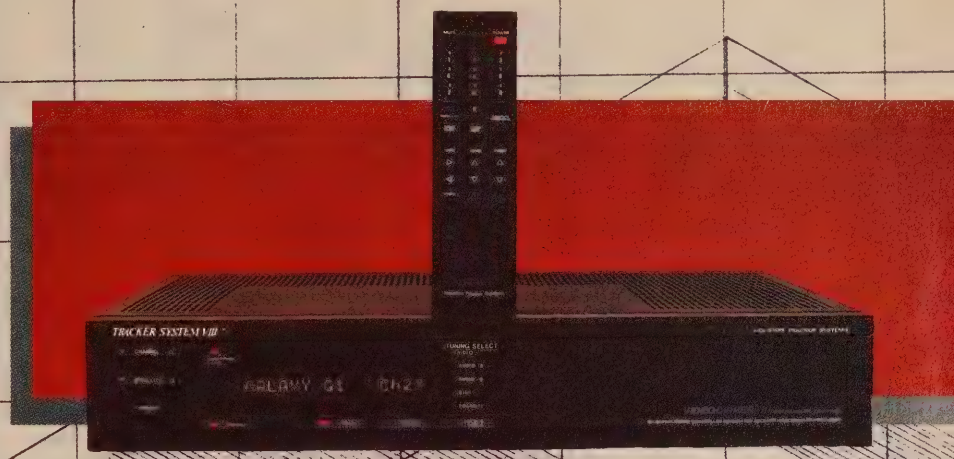

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High-end audio is generally perceived as costing a little more than the average, run-of-the-mill "rack systems" selling at your local chain-store, which is to be expected. You can get respectable sound quality from a basic high-end audio system costing as little as a couple of thousand dollars, or close to $100,000 for a reference system of the type often discussed in *The Absolute Sound* and *Stereophile* magazines. Sure, that's big money, no question about it. But we're talking here about *the ultimate:* components better than any consumer system, superior even to the equipment found in the finest recording studios and broadcasting companies in the world. And for some people, $100,000 is a small price to pay for this kind of *ultimate* satisfaction.

It's not this easy with video. What if a consumer, tiring of the usual run-of-the-mill products, wants to invest in a *real* state-of-the-art video system, offering performance clearly superior to anything else available? There's a major dilemma here, and it's called money: the ultimate video system, consisting of video recorder, camera, videodisc player, satellite receiver, and speaker system, could easily cost nearly *one million dollars,* and most likely more. This is no exaggeration.

It's because of this incredible cost that you really see any professional broadcast video components in people's homes. Generally, the true state-of-the-art video equipment, capable of producing picture quality approaching that of a projected film print, are found only in broadcast studios and major production houses. We're talking a minimum of $50,000 for a basic video recorder, and up to $150,000 for a VTR like an Ampex VPR-3, offering all the bells and whistles...or even $200,000 for a digital VTR, such as Sony's new D-1. And, naturally, you've got to have at least two VTR's, so that you can make copies when necessary.

Cameras? Get ready to mortgage the house, bub, because the cheapest true broadcast color camera is at least $20,000, and more like $80,000 if you get the finest, most fully-featured, computer-controlled Ikegami available. Of course, your camera is completely worthless without a top-quality zoom lens, like a 10-1 electronic zoom from Angenieux, Canon or Fujinon. And don't forget to add at least another $10,000 or so for support gear, like tripods, dollies, and the like.

Professional color monitors are generally available only in sizes of 19 inches and under, because of the difficulties in manufacturing blemish-free tubes. Pro monitors, made by manufacturers like Barco, Conrac, Ikegami ShibaSoku, and Tektronix, are all designed specifically with long-term reliability in mind, so that the picture you see today will look the same tomorrow, next week, or even next year if need be. Their cost: a whopping $7,000 and up, again depending on features—and this doesn't include a top-notch off-air tuner! If you wanted something a little bigger, there are professional large-screen projectors available from companies like Barco, Eidophor and General Electric, with pricetags in the $50-100,000 range. Most of these big screen systems use special digital scan-doubling circuits to increase the amount of apparent resolution to minimize the 525-line limitation of standard NTSC video, projected on screens up to 20 feet wide or more.

Despite rampant price-cutting in the consumer satellite business, most professional downlink receivers like those from RCA and Scientific-Atlanta are still hovering in the $5-10,000 range. Oh, and get ready to bulldoze the

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Continued from page 77

garage and sacrifice the flowerbed: you'll need all that space for a 10-meter dish antenna, which adds another $10,000 or so to the system.

But wait, there's more: special Tektronix oscilloscopes, known as waveform monitors and vectorscopes, designed to help adjust the brightness, contrast, and color of the video signal, with the aid of a proc amp. You'll also want Ampex or Sony Time-base correctors, to stabilize the tape machine playback. To allow you to watch and listen to any source, anywhere you want to, you'll need Grass Valley distribution amps and routing switchers, to act as sort of a "videophile" preamp and source selector. And it's important to have special Beldon video cables designed to resist interference and avoid any loss in the signal, for several dollars a foot.*

The list goes on and on—and adds up to a cool $500,000 easily, for even a minimal "ultimate" video system. (And remember: that's without *any* audio facilities!) Now, even supposing you had the money to buy such a state-of-the-art video system, just *where* would you buy it from? Outside of perhaps the largest urban centers, there are no videophile stores that sell and demonstrate these types of components. Many of them are available only directly from the manufacturer—provided you're willing to get on a months-long waiting list.

*Half a million dollars...*and probably another $100,000 for an *ultimate* audio system! For that kind of money, it might be a lot less trouble just to buy your local Bijou! All you need is a steady supply of feature films to satisfy your cinematic thirst...but buying film prints is both risky and expensive.

There is a possible alternative: in the

Continued on page 80

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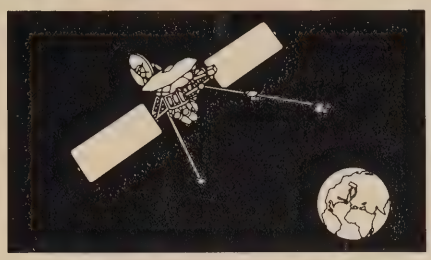

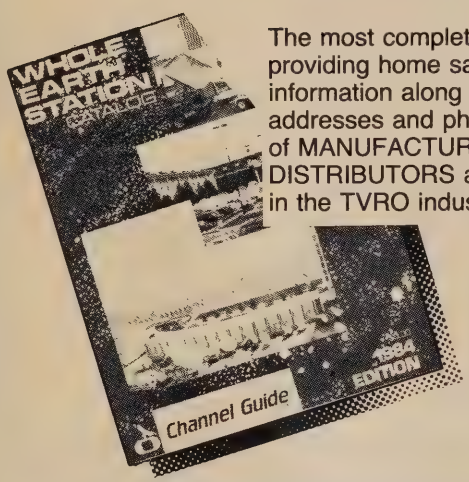

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Continued from page 78

"twilight zone" between consumer and high-ticket professional video products, there's a whole smorgasbord of recorders, monitors and related gear, most of them intended to provide slightly better performance than any comparable consumer product. some models are hard to find at your local discount store, because the manufacturer only sells them to stores who promise to provide the service and extra support these products, by necessity, demand. Others are super-deluxe consumer products that, by their very nature, cost a bit more than the usual recorders, cameras, and monitors normally sold by the average video store.

We're a little torn on the issue of large-screen TV. At this still-primitive stage in the development of projection TV, in our opinion, not one of these systems, regardless of price, still offers picture quality comparable in every way to the best standard direct-view tube monitors.

More importantly, neither the best commercially-available monitor or projection system comes close to capturing the quality of a projected film print. For the purposes of Videofax, we consider the latter to be the *ultimate* visual reference in terms of image quality. Just as audiophile journals constantly advise their readers to go out and experience the sound of live, unamplified music as a reference for their ears, we advise all of you to go to your best neighborhood movie theater and experience a *really* large, high-quality image. At the very best movie theaters —for Los Angeles, that would include Mann's Chinese, the Avco in Westwood, and the Pitt in Century City— the experience is as close to Nirvana as any videophile or movie fan can have. Add to that the extra dimension of high-quality THX or HPS-4000 speakers and Dolby surround sound, and... well, to paraphrase Woody Allen, "it's about as much fun as you can have with your clothes on."

Despite the reservations on projection TV, we acknowledge the dramatic impact even a marginally-flawed large-screen video image will have on almost any viewer. In fact, given the success of manufacturers like Mitsubishi in perfecting 35- and 40-inch picture tubes, it may be possible that the future of large-screen TV may lie in *tubes*.

*But, of course, audiophiles are no strangers to high-priced—some would say *overpriced*—cables. Several top-rated phono cables sell for a minimum of $100 for a 1-meter pair.

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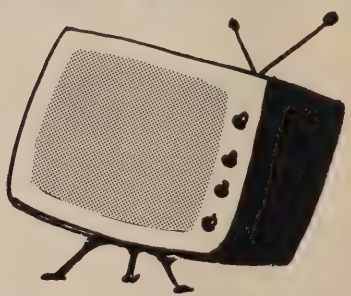

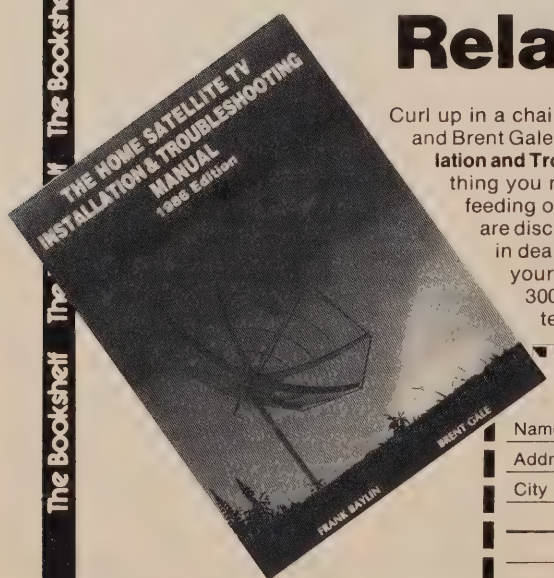

Curl up in a chair and read Frank Baylin and Brent Gale's **Home Satellite TV Installation and Troubleshooting Manual**. Everything you need to know for the care and feeding of your satellite system is contained in this book. Theory and details are discussed and well illustrated. Step by step guides will give you confidence in dealing with problems. The material is intended for dealers as well as do-it-yourself advocates and is clearly and logically written. The book contains over 300 pages and 300 illustrations. Put yourself in control of this modern technology.

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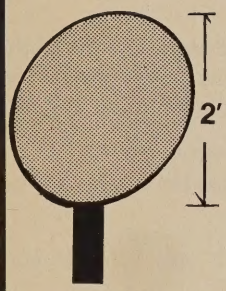

Satellite communication systems operating in the Ku-band frequency range are becoming commonplace in nations throughout the world. This complete manual by knowledgeable authors Frank Baylin and Brent Gale is built upon new information in this fast-growing field. The authors discuss component theory and operation, design characteristics of Ku-band systems, selecting satellite TV equipment and installation; as well as retrofitting C-band with Ku-band systems. Troubleshooting and repair is also dealt with and the 358-page volume is full of charts, graphs, footprints and illustrations.

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Videofax is a little different from the dozen-or-so other magazines on the market. Sure, we have technical articles, equipment reviews and software reviews. But our approach is from the standpoint of a *very* critical eye. That doesn't win us many friends among manufacturers. Some of them even *hate* us. That's to be expected: **Videofax** is out to satisfy only our readers and ourselves.

Despite our dedicated technical stance, you won't find any unnecessary graphs, charts, or pseudo-scientific mumbo-jumbo in **Videofax**. We never talk down to our readers. We assume you already know the basics. For that reason, **Videofax** may be too much for a beginner to handle. (Don't say we didn't warn you.)

Some of the high-end products we review, like professional VCR's and cameras, might be unfamiliar to you. But don't worry. We'll tell you where to find them, along with our advice on how to buy equipment at the best prices.

Our subjective reviews get down to the nitty-gritty, using our own state-of-the-art in-house video facility. Our critics are professional writers and video engineers with literally decades of experience in both fields. (If you regularly read the newsstand magazines, you'll probably recognize most of their names.) We're hard to please, but we're also prepared to make recommendations when and if a product meets our tough standards. And to insure impartiality, **Videofax** accepts no manufacturers' ads.

Our approach may shock you; it may even make you angry. Honesty sometimes does that to people. What we're all about is the truth: which VCR's and videodisc players deserve your hard-earned money . . . and, more importantly, which *don't*. We're no strangers to controversy. And we're not afraid to name names and print *bad reviews*, when we have to.

Each quarterly issue of **Videofax** is chock-full of features and useful information no video buff can live without, including:

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Our first three issues are already out-of-print collector's items (a limited supply of copies are available at $10 each), and you won't find us on newsstands. **Videofax** is available only by mail. As a special, limited-time offer, a one-year/four issue subscription is only $24. That's nearly 10% off the standard rate, and saves you $4.00 off the cover price. If you're a real videophile, we think you'll agree: **Videofax** is the one video accessory you can't live without.

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When Hurricane Kate shrieked across the Carribean last November, three of our stock Paraclipses in varying sizes were among a total of 22 dishes at Bob Cooper's West Indies Video (WIV) Test Site on Provo Island.

The WIV facility is also responsible for 15 additional "off site" antennas scattered through the Turk and Caicos Islands. And its reason for being there is to test performance... not storm survival.

But Kate could not have cared less.

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Several Paraclipse antennas survived with only minor damages due to motor drive failures.

In the accompanying photographs, you will see antennas utilizing various designs and materials. All of the antennas were equally exposed. None of the photos have been retouched except to delete specific logos.

Hurricane Kate proved that only the fittest will survive. Paraclipse.

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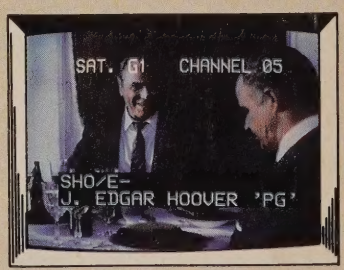

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